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THIS ISSUE

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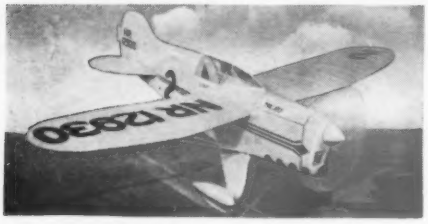

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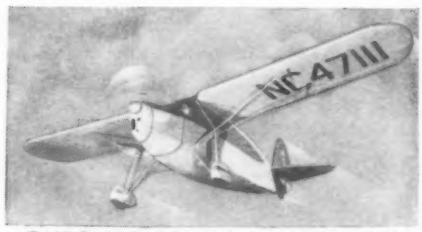

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Volume XXII MARCH, 1938 Number 3

FOR THE PROMOTION OF PRIVATE FLYING AND COMMERCIAL AVIATION

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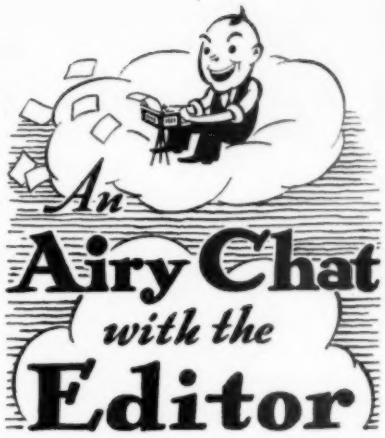


An Airy Chat with the Editor

AT the beginning of each year, up to the present issue, I have always written optimistic paragraphs in regard to the amateur activities destined to take place during the following season. I have, previously, been the little Polyanna of amateur aviation, always believing that we could wangle out of our difficulties by some hook or crook and carry on.

But now, I have lost this spirit of optimism. I am in the dumps, aeronautically speaking, for the Big Guys have practically licked us and the amateur has now the legal status of a Jesse James or a Dillinger. The few states that were open to the amateur flyer and home-builder have finally closed their doors to him and he is now an outcast in his own land.

* * *

FOR the past eight years, POPULAR AVIATION and everyone connected with it have been fervent boosters for the amateur and home-builder. We have battled along, using almost every device that could be named to stave off obstructive legislation, but the commercial interests have proved—to date—too strong for our unaided efforts.

And our efforts were not based upon mercenary objectives or greed. The total number of amateurs is so small that their victory could not show us a noticeable profit either in circulation or advertising, for all of them combined amounts to less than 5 per cent of all persons interested in aviation and aeronautics. We fought for them because we believed in them and admired their heroic stand against legislative invasion.

* * *

INSTEAD, we subjected ourselves to severe criticism and even more direct action by the enemies of the amateur. In their expressed opinion, we were contributors to the delinquency of youth and factors in aiding and abetting law breakers. Yes, you should have seen some of the valentines that these fellows showered in upon us, accompanied by threats of all sorts. And believe it or not, you doubters and scoffers, many of these enemies were potential advertisers.

(*Concluded on page 77*)

BEWARE THE SILENCED

Gliding stealthily down out of the dark heavens, a silenced warplane could cripple a major air base single-handed. Anti-aircraft "ears" would be useless.

WARPLANE

BY
ARCH WHITEHOUSE

THE World's Mightiest Bomber! The Fastest Fighter in any Air Service!

The Navy's Newest Flying Dreadnaught!

The Winged Fortress!

All these catch-phrases and many more have for years represented the latest military types designed to strike terror into potential enemies. We boast of the bomb load, the range of action, the armament carried and the efficiency of modern military engines, but none of these compare in destructive power with the silenced airplane.

For years now, military experts all over the world have been predicting the perfection of a plane that will come out of nowhere, without a sound and bomb our cities without any of us knowing what has happened. There is no defense against such a weapon and already forces abroad are attempting to draft laws which will outlaw any fighting plane equipped with silencing apparatus.

A completely silenced airplane would be a boon to civil and commercial flying, for sound created by the motors and propellers has long been one of the bugaboos of commercial aviation. Thousands of dollars have been spent in research trying to find the answer to the silent plane. Thousands more have been put into acoustics and sound-deadening materials to make the cabins more comfortable for air travel, but once we find the answer to the silent airplane war will take on an added terror. If we attempt to divide the weapons of war into offensive and defensive classes, the silenced military plane must be considered the most offensive instrument conceivable.

Let us presume that a completely silenced bomber, or a fleet of such bombers, is sent off to attack any of our key cities. If they are silenced they will first of all deny us any chance of detecting them and eventually intercepting them, for the first stage of defense against air attacks is based on sound, and if our anti-aircraft detectors cannot hear their approach, they cannot warn the defensive air squadrons.

Should these theoretical raiders decide to strike by day, so that they can be seen, the lack of noise will completely nullify all chances of predicting the range, for most range-finding instruments are operated on the basis of sound picked up by suitable microphones. Without sound of the accepted intensity, our defense services have been made impotent.

Night raiders, streaking across borders from unknown bases will be able to evade our searchlights, because the sound detectors will never reveal their presence. Eliminate the value of the searchlight, and the defensive ships in the air are powerless to find their targets. Clouds or particularly dark nights will give the silenced raider immunity he has never enjoyed before.

Should this situation arise, our only weapon will be a counter-bombing offensive against the enemy. In other words, we should have to accept the fact that the enemy *can* bomb our ports, forts and key cities without danger, and our only form of reprisal would be to bomb his bases in turn. This is not a pleasant picture, for it is obvious that any enemy attacking the United States would have to do so from flight-decks of aircraft carriers, the catapults of battle cruisers or from secret bases in Mexico or Canada. Surface craft can move and would have to be found before such reprisals could be efficiently carried out. Secret land bases would be just that, until they were uncovered, and meantime the enemy would have our bases, ports and key cities at his mercy.

But, naturally you will ask: "Is there such a thing as a silenced plane, or is such a plane feasible?" For years now we have heard of silenced war planes. We heard the rumors of silenced planes along the Western Front in 1917 and 1918. After the Armistice was signed, the rumor still stood up and we were told that the Allies did have a silenced plane, but the war ended too soon for it to be used.

Since those days the story of the silenced plane continues to crop up. Not long ago we got reports of a mysterious silenced plane flying over the Scandinavian countries. It was a secret German plane of course. Once the wreckage of a mystery plane was found outside Stockholm but the matter was hushed up, because the Swedish officials found a special bomb, the secret of which has been hidden away somewhere.

On several occasions the French government has reported that a silenced plane has been seen flying over certain sections of the Maginot Line. Planes have been flown in England which, at normal cruising speed, have made no more noise than an expensive automobile. In another instance a Cirrus-engined Leopard-Moth, equipped with a Vokes silencer passed over a group of observers at the height of 500 feet. To a man they agreed that had they not looked up they would have considered that the sound was nothing more than that of an automobile passing along a nearby road.

But this is not the answer to the question: "Is there such a thing as a *silenced* plane?"

From information recently received from a reliable source in Europe, I have been told that a silenced plane has been seen—but not heard—on the Spanish war front. My informant is a young Dutchman who is considered something of an expert in aeronautical matters. In a letter sent to me from Amersfoors, Holland, my informant explains that a Dutch news correspondent named Domyn Keller has

This is no fairy-tale. The writer foresees a type of warfare that threatens to do away with present anti-aircraft defense

Reports from war correspondents in Spain hint that a fast new warplane that can be seen but not heard is a silencer-equipped Henschel HS-122 like that above.

actually seen this plane, near the ground and in the air.

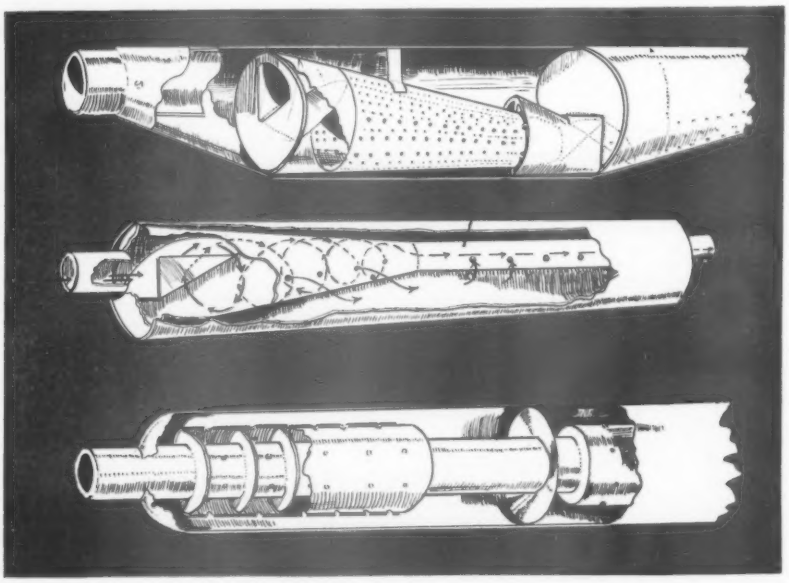
Keller states emphatically that he was invited to inspect a squadron of Franco fighters near Bilbao and while there saw an ordinary reconnaissance machine circling the town.

At once the realization struck him that the plane was making no noise of any kind, and he commented on the fact but got no response from the officers who were conducting his tour. A few minutes later the plane came in showing every indication of landing, but apparently the pilot was given a signal from the ground and shot the juice to the engine again.

Keller states that he saw the plane come down to within 40 feet of the ground. He saw it stiffen in flight, just as it would under ordinary conditions when the throttle is rammed forward. He saw it zoom and climb away—*but he heard absolutely nothing!*

The ship climbed fast, circled again and disappeared in the direction of Burgos. Further investigation of this silenced plane shows that other correspondents have seen this ship, but few European papers will print the story. A short time ago the *Daily Herald* of London admitted that certain German engineers have successfully silenced several Vee-type and in-line aviation engines. A small flight of light military planes equipped with these silencers have been seen over Kottbus, but in every instance they have been "covered" by modern fighters that were powered with engines of normal output, i.e. not silenced.

I have also learned that as far back as 1932 the Germans had succeeded in silencing high-power engines so well that they had eliminated 70 per cent of the noise. In 1936 the new Henschel factory was given an order for a number of silenced planes but a young Polish spy uncovered the details and for a time the Polish-German espionage question was a very touchy subject. The firm did go through with the order however, and it is believed now that the planes being used by Franco's troops on the Spanish front are Henschel HS-122s fitted with a 650 h.p. B.M.W. liquid-cooled engine.



These are three representative aircraft silencers. Sketched by the author, the silencers shown are, from top to bottom, a French (presumably) Vokes, another Vokes (called the "Blanvac') and one of those developed by Britain's Royal Air Force. As can be seen, all these employ a series of variously-designed baffle plates. Biggest drawback to this type silencer is that it necessitates a prohibitive amount of power loss. New "secret" designs may have overcome this.

If a reconnaissance plane can be silenced, there is no reason why high speed bombers could not be sent aloft in comparative silence.

For a number of years we have seen steady progress made in silencing planes. What has been the drawback, and what feature must be worked on to attain ultimate silence? Engineers tell us that noise created by airplanes can be divided into three distinct classes. First there is the noise created by the engine itself, then the noise created by the propeller and third the noise made by slipstream passing protruding sections of the general structure.

If we take the sound of a plane in actual flight and set up a theoretical standard for the noise created, we get a sound volume of 100 decibels (units of sound). According to sound engineers, these 100 decibels can be credited as follows: propeller, 62 decibels; engine, 32 decibels and slipstream, six decibels. These figures change with certain conditions, engine speeds and in relationship of the ear to the arc of the propeller.

We learn that certain known types of motor silencers will reduce the engine sound about three-fourths and that reducing the speed of the prop to what would produce a normal cruising speed, about 40 decibels can be dropped from the propscream. Thus, if we can still reduce slipstream noise by cleaning up the general design of the plane we can reduce the decibels to something about 33 decibels which according to sound experts would be no louder than an average toned radio being played softly in a modern apartment.

It can be seen of course that the greatest problem will be found in taming the scream of a prop. On an ordinary high power engine turning out 1,800 r.p.m. the prop tip whips the air at a speed of about 30 times a second. If the propeller could be designed to do the same amount of work at half that speed, the sound would be reduced about 50 per cent. If our variable-pitch prop designers can uncover the secret of slower speed, suitable pitch and blade efficiency we shall soon get to the bottom of the secret silenced plane.

Some time ago Lawrence A. Clousing had an article in POPULAR AVIATION in which he used some pretty convincing statements and figures that showed how difficult it would be to silence a propeller. He explained how the prop created the noise and the reason for the varying tones noted according to the position of the ear in relationship to the arc of the prop.

The actual noise is caused by air rushing into the cavities created by the whirling blades. If you watch the blades of a steamship propeller churning in the water, you will notice how water rushes back to fill the space left open by the high-

(Concluded on page 94)

"I WAS A FLYING RUM-RUNNER"

ANONYMOUS

Here is the story of a pilot who once made money "the easy way". Young adventuresome pilots should read this.

ON THE edge of a level field near Delray, Florida, three U. S. Customs officers crouched behind a bunch of tall grass. Each man held a rifle, ready for action. At the other end of the field, a heavily loaded monoplane kicked up a cloud of dust as it touched the ground, its idling engine barely audible to the officers.

The ship, a Curtiss *Robin*, came taxying down toward their hiding place, then swung alongside a sedan that had just been driven up, less than ten yards from the officers. Just as the pilot reached for the door handle, the armed men stepped into view.

"Halt!" they commanded.

I was quite startled by that command, because I happened to be the pilot of the ship. Naturally, I didn't know, until after I landed, that those Customs officers were hiding behind that bunch of tall grass. If I had, I certainly wouldn't have landed there.

Upon hearing the shout, I sat perfectly still for a few seconds, then suddenly opened the throttle a few notches. I believe that instinct, rather than a conscious effort, was responsible for this move. Through training and experience, an airplane pilot will subconsciously open the throttle when danger threatens, whether it be a stall, spin, or whatnot. Anyway, when I opened the throttle, one of the officers jerked up his rifle and fired at the ship. Spurred into action by the rifle report, I shoved the throttle wide open and roared away down the field under a hail of bullets.

Meanwhile, the sedan had disappeared, leaving the Customs officers to stare at the ship as it flew out of sight.

A few moments later, I was flying high above the Gulf Stream, comparatively safe so far as capture was concerned. In the fabric were five bullet holes, and in the cabin were 20 cases of contraband liquor—the reason for the officers' interest in the ship. Since I hadn't been able to deliver the cargo, there was nothing else for me to do but return it to "headquarters". And, in less than an hour and a half, I had landed there.

"Headquarters" were located at West End, a small settlement on Grand Bahama Island, 72 miles due east across the Gulf Stream from West Palm Beach. A British possession, this island has long been a rendezvous of smugglers and rum-runners. Within recent years, airplanes were introduced at West End for running contraband goods into the United States. It's hardly necessary to mention that airplanes are unusually well suited for this purpose, because it's hard to capture one unless it can be caught on the ground. So the rum-runners weren't long in adopting this form of transportation. For the past few years, airplanes of all types and sizes have become a familiar sight to the Bahama natives, who, incidentally, are practically all Negroes.

The little episode just described, in which I figured so prominently, took place one afternoon in April, 1933, when aerial rum-running was at its highest peak of activity. During the spring of that year, more than 15 liquor planes were flying from West End into Florida, each making an average of three round trips a day. In fact, more flying was being done from this tiny island settlement than from some of the busiest airports in the United States.

This liquor ship once flew mail on a transcontinental airline.

There were five liquor warehouses on the island, each having a storage capacity of over 20,000 cases. And they were all doing a rush business, too. The liquor, coming from nearly all the leading European countries was brought to West End by boat via Nassau. From West End, most of it was flown into Florida, nearly 1,200 cases a day being delivered by air to jobbers in the Gulf State. And it's obvious that a neat profit was provided through evasion of the Customs duty, made so easy by the use of airplanes.

The lure of adventure and easy money, and a chance to get plenty of flying experience, proved irresistible to many young pilots of this country. And I wasn't immune.

In spite of the fact that all the flying was done over the Gulf Stream—a region well-known for its treacherous weather —none of the airplanes were equipped with blind-flying instruments of any kind. The only navigation instrument was an old-fashioned magnetic compass of a type now considered obsolete for aircraft use. A small rubber boat made from an auto inner tube was the only safety device provided. Most of the airplanes were machines discarded by transport companies as obsolete equipment, while others were experimental types that were never placed on the market.

Yet, there were only four forced landings and two fatalities during the several years in which airplanes were used by rum-runners in the Bahamas. Since the

planes were usually loaded beyond their rated capacity, this is indeed an unusual record of reliability, comparing favorably with safety records of many commercial airlines.

After spanning the 72 miles of open sea, the rum-running pilot faced the problem of setting the ship down on an isolated field to place the load in charge of a ground crew, who delivered it in an automobile to the buyer. It was customary for the crew to reach the field a few minutes ahead of the plane, and search thoroughly all possible hiding places for officers. Failure to observe this precaution was, undoubtedly, the cause of several captures. In fact, it was this negligence that prompted my hasty departure from Delray.

When the "coast was clear", the ground crew would flag down the low-flying liquor plane with some pre-determined signal, which, in most cases, was the spreading of a big sheet on the field. But, as an extra precaution, the pilot always made it a point to recognize one or more members of the ground crew before landing. In trying to identify the men, he usually did so as he approached the field on a straight course. Circling attracted too much attention.

Fields used by the smugglers were located near Fort Lauderdale, Miami, Hollywood and Delray. Once in a while, though, an order would be received from a customer on the west coast. Any one field was hardly ever used more than twice in succession by the same pilot. The fields were identified by numbers, each pilot having his own number for a given field. And this number, selected by the pilot, was known only to him and the persons ordering the contraband goods. For example, one pilot's Field No. 6 might have been known as Field No. 2 by one of the other pilots. When a customer sent in an order for liquor, he merely specified the number of cases, the brand, and the identification number of the field where he wanted it delivered. This method provided some protection if the order happened to be intercepted by the authorities.

The liquor, ready for shipment by air, weighed from 38 to 50 pounds per case, depending on the way it was packed. Twenty cases was the average load for the Curtiss *Robin* and similar ships, though some of the larger machines would sometimes carry 50 cases or more. It was usually packed, for convenience in handling, in half-case lots, consisting of six quart bottles or 12 pint bottles in a cardboard box. These boxes, in turn, were sewn up in burlap bags.

Speed was of the highest importance in unloading a liquor plane; the longer it stayed on the ground, the greater the chance of capture. By fast work, the average consignment of 20 cases could be unloaded within 30 or 40 seconds. Two minutes was a very long time for the plane to stay on the ground at the unloading end of the line. The motors of both plane and automobile were kept running, of course.

One pilot of my acquaintance, after being nabbed by the Federal authorities, thought he had a clever scheme for escaping, or at least putting two of the officers in an uncomfortable situation. Some of the Federal Agents who made the arrest went back to their headquarters in an automobile seized in the raid, while two of them boarded the plane and ordered the pilot to fly them to the Miami airport. He took off without a protest, but after flying toward Miami a few minutes, he swung out over the Gulf Stream with West End the next stop. One of the officers made a threatening gesture with his gun and ordered him to turn back.

He ignored the command, reminding the officer that there was little danger of his using the gun.

"You'd be in a fine mess up here with nobody to fly the ship."

"Oh, yeah?" said the officer, taking a transport license from his pocket for the astonished pilot's inspection.

"Boy, oh, boy! That one sure came close, eh?"

They landed at the Miami airport.

Absence of the ground crew caused me quite a lot of trouble once. Late one afternoon, during a spell of bad weather, I found the crew missing when I reached the field. I circled around about an hour, waiting for them. By doing so, I probably aroused suspicion, and somebody notified the officers. For, on the way back to the island, I was overtaken about two miles out from the coast by some Federal Agents in a Travel Air monoplane, armed with a machine gun. Drawing up alongside my ship, they motioned for me to turn back. I only shook my head and pointed in the direction of West End. When they repeated the signal and I refused again, they fired a burst from their machine gun, knocking a rocker-arm cover off my engine.

After following me for several minutes, they finally gave up the chase and turned back as I neared the 12-mile limit. As soon as they were out of sight, I turned back, too, because I had gotten off my course and wasn't sure just how far off. So I didn't care to take the chances of trying to fly on to the island.

In the gathering darkness, I landed on a field half-covered with water, deep in the Everglades. Here, I unloaded the liquor and hid it. Then I took off with much difficulty, barely clearing the trees, and flew to a spot nearer the highway. Here, I landed again on a water-soaked field, and walked to the highway. Picked up by a passing motorist, I rode to Boynton and phoned one of the ground crew to come after me. Together, we went after the load of liquor I had hidden. I had concealed it so well that I couldn't find it myself until after nearly an hour. It was quite a distance from the highway, so we hired several Negroes to carry it to our car. It was finally delivered late in the night.

Later, I had a narrow escape from capture at the Fort Lauderdale airport. I had landed on the airport to unload a consignment of liquor, in plain view of the Florida East Coast Railroad and the Federal Highway. Just as the last case was unloaded, a group of Federal Agents came racing up in an automobile. All in the same instant, two of the ground crew disappeared in their car; I started taxying across the field; and three members of the crew, cut off from their car by the officers, started running across the field. I called for them to get into the plane, but they didn't try it until the officers took up the chase in their automobile. Then, two of them scrambled into the front cockpit, already occupied by my mechanic, while the other one stayed on the wing close to the fuselage—through necessity and not choice, I might add. Rolling at nearly full speed to the end of the runway, I turned into the wind for the take-off. The officers tried to intercept my path as I gathered speed and was just ready to lift the ship off the ground. They cleared the tail about 20 feet as the wheels left the runway.

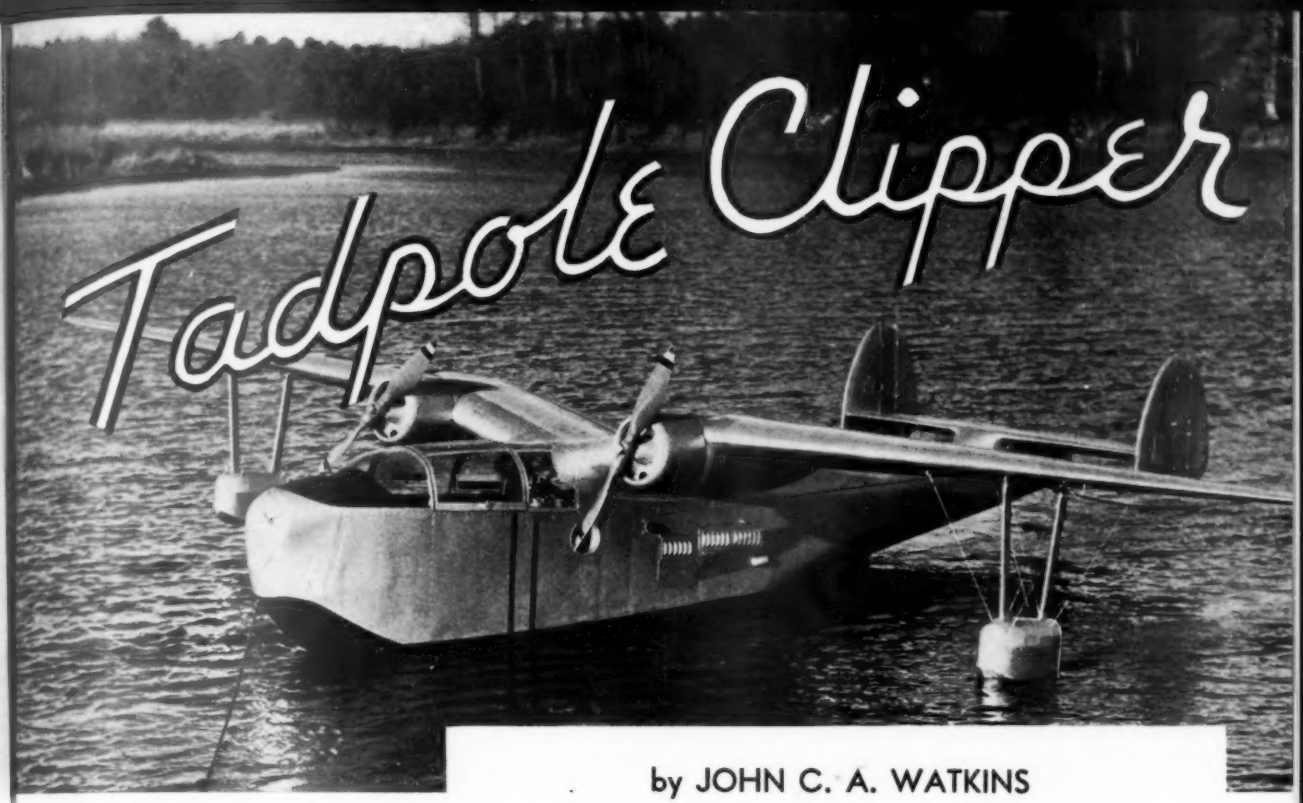
I was flying a Waco biplane at that time, built to carry only three persons, but I got off easily with five, including myself, and flew to a field about ten minutes from Fort Lauderdale. Here, I landed and dropped off the three members of the ground crew, then headed back to West End.

The time spent on the mainland was so limited by circumstances that a liquor plane just a few minutes overdue was sufficient cause for anxiety among the pilot's friends remaining on the island. Among several things that might have delayed the return to West End, capture by the authorities, or a crack-up when landing or taking off, were the two most likely. A crack-up on the ground was considered a trivial affair, however, compared with a forced landing in the ocean.

On one occasion, a pilot took off from West End at 11 o'clock one morning with 40 cases of liquor, due back in an hour and 45 minutes. When that time had passed, and he didn't show up after several minutes, his pilot friends became

(*Continued on page* 88)

Tadpole Clipper



by JOHN C. A. WATKINS

If Glenn Martin's "toy" clipper works out, expensive tests will be greatly lessened.

BUZZING around high above Maryland these past few weeks has been a little airplane that may be one of the most important developments in aviation's brief history. Unexciting in itself, the tiny craft may result in the development and construction of airliners so much larger than any now in existence or under way that the average mind will be unable to appreciate their dimensions.

Built by Glenn L. Martin at his bustling factory near Baltimore, the little ship is the world's first *man-carrying, scale flying model* of a full-sized flying boat. Its purpose, briefly, is to determine at low cost the performance and characteristics of a projected aircraft which would cost hundreds of thousands of dollars to design, manufacture and test.

There is no doubt that both American and British manufacturers specializing in the construction of the flying boat type of commercial airliner have done a good job. Witness the Martin flying boats now used by Pan American Airways on the Pacific, and Imperial Airways' new Short Brothers aircraft.

However, all these manufacturers have been working under serious handicaps. When they have conceived a revolutionary new airplane, whose development and original engineering costs may amount to as much as a million dollars, they must determine its potential performance and characteristics.

Today the only method available to them is through the use of wind tunnels and towing basins, in which a model is tested under nearly ideal conditions such as the airplane itself might encounter one day in the year. Because of the unnatural, mechanically ideal nature of the wind tunnel, errors are almost certain to creep into calculations reached through its use—errors that may result in complete failure and a consequent

(*Continued on page 72*)

The novel little ship's actual size stands out beside the recently completed Russian Clipper.

HAS A MODERN AIR

Daily newspapers write of current wars as having proved modern military aviation powerless. The author, an outstanding authority on the subject, discounts these frauds.

THERE is ample evidence of a grave movement on foot both in this country and abroad to depreciate and discredit the airplane as a fighting machine, to minimize the effectiveness of air forces and to disparage their capacities and capabilities.

It behooves every patriotic American to strike while there is yet time, to expose this movement before it has reduced our national defenses to an antequated, inefficient nonentity capable of participating creditably in no modern war.

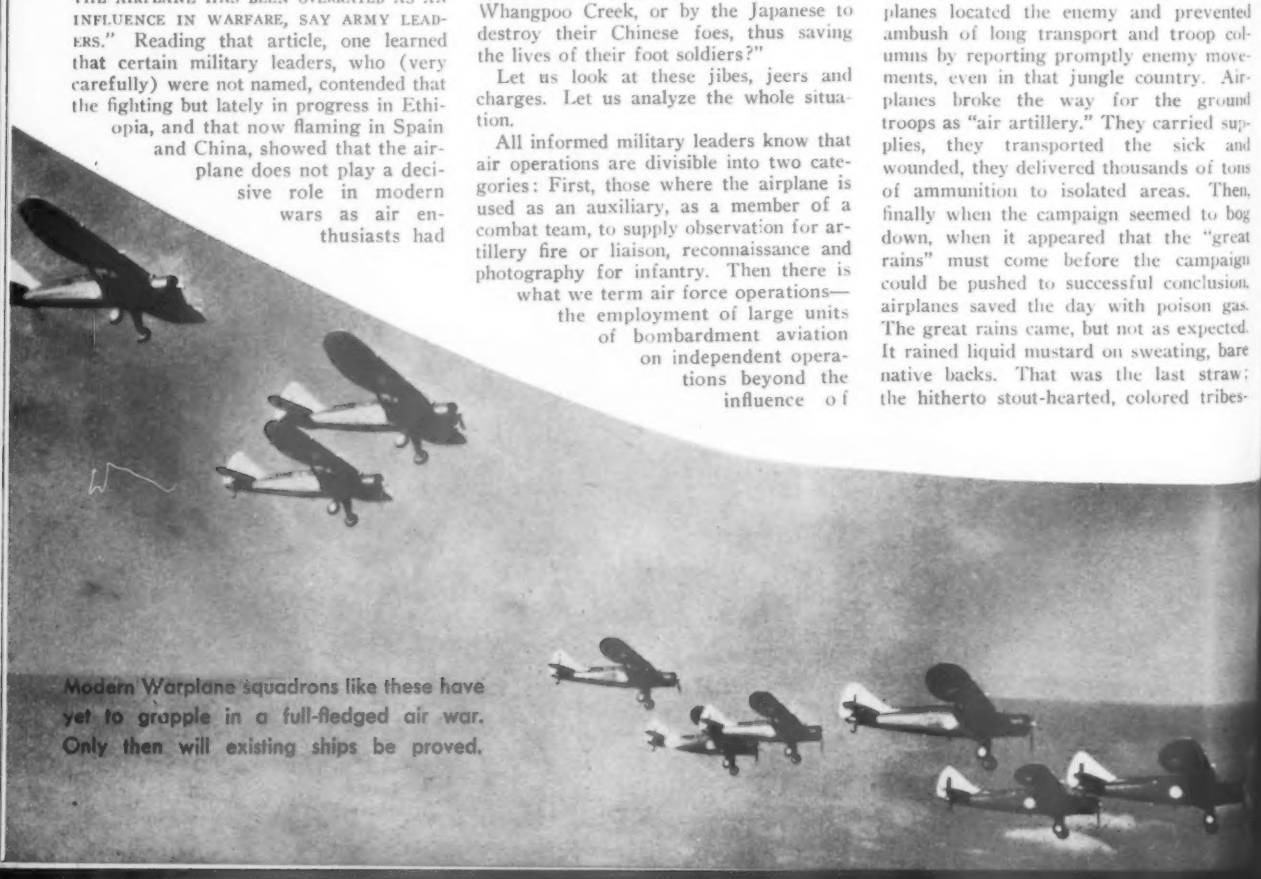
Here are some tangible evidences that such a dangerous campaign, long skulking in the shadows, is now coming out into the open. Not long since a newspaper chain flared forth with a headline: "AVIATION DEBUNKED: THREE WARS SHOW THAT THE AIRPLANE HAS BEEN OVERRATED AS AN INFLUENCE IN WARFARE, SAY ARMY LEADERS." Reading that article, one learned that certain military leaders, who (very carefully) were not named, contended that the fighting but lately in progress in Ethiopia, and that now flaming in Spain and China, showed that the airplane does not play a decisive role in modern wars as air enthusiasts had so confidently predicted. At best, ran this blast, the airplane is but an auxiliary weapon for observation for artillery or reconnaissance for infantry.

Several self-styled official observers have pointed out with evident glee that the airplane, contrary to anticipation and contention, has not played a vital role for either side in the Spanish struggle. Now, they point a finger at the recent operations in China and say: "If the airplane is all powerful why has it not been used by China to sink Japanese warships on Whangpoo Creek, or by the Japanese to destroy their Chinese foes, thus saving the lives of their foot soldiers?"

Let us look at these jibes, jeers and charges. Let us analyze the whole situation.

All informed military leaders know that air operations are divisible into two categories: First, those where the airplane is used as an auxiliary, as a member of a combat team, to supply observation for artillery fire or liaison, reconnaissance and photography for infantry. Then there is what we term air force operations—the employment of large units of bombardment aviation on independent operations beyond the influence of ground arms against important strategic centers such as cities, manufacturing centers or other vital enemy areas.

With these definitions and terms well in mind, turn now to a survey of what actually has transpired in the so-called "three wars"—Ethiopia, Spain and China, if you will. First, Ethiopia. Airplanes as auxiliary weapons played a vital part in the subjugation of that unhappy land. Italian official sources have made that clear; the evidence has been unanimous from all observers who saw that conflict. Italian planes located the enemy and prevented ambush of long transport and troop columns by reporting promptly enemy movements, even in that jungle country. Airplanes broke the way for the ground troops as "air artillery." They carried supplies, they transported the sick and wounded, they delivered thousands of tons of ammunition to isolated areas. Then, finally when the campaign seemed to bog down, when it appeared that the "great rains" must come before the campaign could be pushed to successful conclusion, airplanes saved the day with poison gas. The great rains came, but not as expected. It rained liquid mustard on sweating, bare native backs. That was the last straw; the hitherto stout-hearted, colored tribes-



Modern Warplane squadrons like these have yet to grapple in a full-fledged air war. Only then will existing ships be proved.

WAR HAS NOT BEEN FORGET "NO"

Says MAJOR-GENERAL JAMES E. FECHET

Major-General James E. Fechet was Chief of the U. S. Army Air Corps from 1927 to his retirement in 1931. He first enlisted in the Cavalry (1898), transferred to the Air Corps in 1917, rarely flies today.

** * * Opinions expressed herein are those only of the writer himself.*

men took their burned and festering bodies elsewhere. They saw no hope to combat such a menace. Thereafter, with attack planes spraying gas and dropping bombs, ever leading the way and breaking up all organized resistance, the ground columns moved forward steadily with but little opposition.

But what about Air Force operations?

There were none. In the first place there was little need for such operations, there were no vital centers in Ethiopia, no fleets of battleships to be sunk, no great cities to be depopulated, no railroads to be cut or great industrial areas to be rendered unproductive, Italy had an air force but she had possible need for it closer home; just the threat of it was keeping the Mediterranean open; sitting quietly on its airports at home it tended to keep any possible Ethiopian allies from coming into the picture. In that war, if it were not the air force alone that won, who can say it was not the presence of the air force which kept Italy from losing. But, at any rate, the waiting world got no opportunity to see an air force in action, though it did see effective air cooperation; it saw airplanes join in a combat team and do the fullback's job, carry the ball to the winning touchdown.

So, it is quite clear that the ghoulish enemies of air forces can draw no consolation nor point any finger of scorn at air operations in Ethiopia, if they but adhere to the facts as clearly distinguishable and long since recorded in military history.

Next, turn to the Iberian peninsula. Check up on the civil war in Spain. Here again airplanes have been much publicized and often used and with good effect by both sides in cooperative missions. They have done good observation work; they have been used as attack aviation against front line troops; there have been isolated cases of individual planes dropping light bombs even over cities.

Right here at this point I must ask for time out to make an interesting allied observation. Not long since an article appeared in a national magazine entitled "Airplanes Can't Sink Battleships." It proved by a series of propaganda-inspired, theoretical observations that the modern battleship is impregnable to attack from the air. But within the week an unkind providence played the dirtiest trick conceivable on the writer and his misguided disciples. A battleship lay on the Mediterranean, there was a roar overhead, two or three little airplanes appeared; anti-aircraft guns blazed. The next instant down came some fairly small bombs. Then the ship turned over and disgracefully slid beneath the waves. Airplanes couldn't sink battleships, but this one, unfortunately, had not read the article. It sank. First there was horror, then glib excuses began to pour in; it was an old ship; new ones wouldn't have sunk thus ignominiously. But luckless fate was not done. A few days passed and again airplanes appeared above a battleship, a new one, among the latest Germany had floated; again a very few small planes came over and dropped some light bombs. The finest anti-aircraft guns in the world did not have time to get into action. The battleship became a floating morgue, absolutely incapable of any effective action as a fighting craft. Of this attack, speaking in the presence of Chancellor Hitler and War Minister Von Blomberg at funeral services for the German sailors killed in the attack, Admiral Commanding Raeder said:

"The airplanes were sighted despite unfavorable weather conditions. The commander of the *Deutschland* gave orders to sound an air alarm and to open fire.

"Immediately afterward two bombs

fell from the planes before it was possible to open fire.

"Following the attack, it was impossible to fire on the retreating airplanes because they were hidden from view by the smoke of the fires caused on the deck by the bombs."

But these were not air force operations. They were sporadic attempts by light bombers, dropping light bombs. There was no concerted action by large air forces, armed and equipped as modern air forces the world over now are armed and equipped. They were not, by the wildest stretches of the imagination, air force operations.

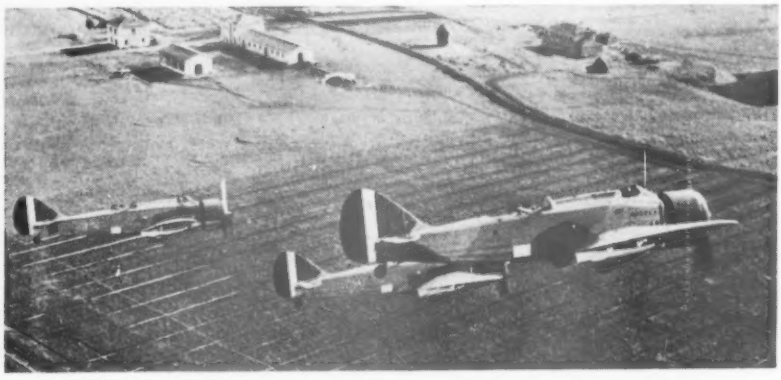
The truth about the matter is, and all military observers know it, that Spain is a proving ground for air equipment. A testing locale for individual plane types. Certain of the interested nations have an understandable urge to try out their latest in fighting aircraft. Spain seems to offer an excellent opportunity for that practice and experience. Reports on all fronts in Spain, from reliable news sources, show that individual experimental planes and small service test lots of the most modern types have appeared there. But never have they appeared in large numbers, in squadrons, groups, wings or divisions. There have been no efforts by planes in force to destroy cities. True a few bombs have dropped in Madrid; but these efforts have been by one or at most but a very few planes. Again it is perfectly patent that both sides deliberately refrain from bombing cities and civilian population.

Here is one conclusive reason why I know that air force operations have not been conducted by either side—there is no report of a bomb having dropped on that war-torn land larger than 600 pounds, and 300 pounds have been rare. The average size seems to be nearer 100 pounds. Modern air forces normally arm with 1,100 pound and 2,000 pound bombs for material destruction.

Here is another reason why I know that serious air force operations have not been attempted: there is no evidence that either side has used poison gas; no effort has been made to depopulate large areas; there has been no attempt to strike terror into a whole population; there has been no effort to break the will to win by mass slaughter. Manufacturing areas have been left undisturbed and productive; shipping has not been attacked on a large scale; rail lines have not been cut and kept cut. Observers say that lights still blaze in the cities and picture shows are open and flash their garish signs five miles behind the lines. Believe me, ask anybody who was in Paris or London during the last war—take it as gospel that there would be no lights in any city in Spain at night if a first class air force were around and about or overhead. No, there is not one scintilla of evidence of any *air force* operations by either side.

Why? Your guess may be as good as mine—but here is mine. First, neither side has an effective, organized air force; secondly, neither side desires to destroy the land, depopulate the cities, make irreparable enmities. Both sides hope to be living presently in those cities, to be controlling the government, profiting by an undisturbed industry. Remember this is a civil war.

Now take China—look at the fighting around Shanghai. Here again the papers have printed much about air fighting. It is spectacular. It is relatively new. It draws interest. Here as before there is ample evidence that airplanes have been used by both sides. But how? There have been dog fights in the air over Whangpoo Creek and isolated bombs have dropped in Shanghai. Planes have tried haphazardly in individual attempts to bomb surface craft employing small planes dropping light bombs. Likewise there is evidence—and many reports verify the fact—that planes are being used for surveillance, photography, observation and artillery adjustment. But here again there are no air force operations worthy of the name. And again you ask why? At least one of the combatants is known to possess a respectable air force.



Italian Breda fighter-bombers like these have yet to meet a first-line aerial enemy. Italy's air force ranks high among world powers in numbers, not quality.

Here are some possible reasons. Observation and attack planes—planes capable of operations against ground troops only, planes which can carry but light, 50 and 100 pound bombs cannot conduct air force operations. If you had but 400 such planes would you consider it good judgment to irritate your combatant who was known to possess more than a thousand planes of the same type as yours and who, in addition, has several hundred heavy bombers which could carry the war to your cities and populated areas; who could destroy your manufacturing areas, rail lines and ground and water transport? The answer is self-evident. China cannot conduct air force operations because she has no capable air force. Air force operations would require her to take her airplanes to Japan one some dark night, to hit Tokyo. Why not? Well, get out a map, draw a line from the nearest known Chinese flying field to Tokyo. You will find it some 1,000 miles. That means that if China is to get her airplanes back they must be capable of flying for 2,000 miles. All the world well knows that she has no heavy bombers suitable to that task. There you have your answer—distance, lack of sufficient long range bombers.

Now why does not Japan resort to air force operations? The conditions seem ideal to the amateur strategist. Here are some possible reasons to the contrary: remember this is no war—it has not been officially declared. It may suit Japan's purpose admirably to appear on the defensive, merely to be policing the country, to be making an honest effort but to right wrongs done to her nationals. If her air forces destroyed Shanghai or any other large city of China no one could longer doubt that war in fact existed. Large numbers of the nationals of other countries likewise would be destroyed at the same time. There would be complications. But until that happens, until large forces of bombers strike industrial centers with heavy bombs and gas, until rail lines are broken, until shipping is destroyed, until vital areas have been repeatedly bombed and kept ineffective there have been no true air force operations.

There you have the picture. There you have the whole story. Here we have taken a quick but accurate look at the "three wars." We have found that airplanes have been used in all of them as working members of the combat teams, and in such capacities they have done nothing to discredit them as effective war machines. But as for air force operations none have occurred.

This effort of the old school soldier to discredit air forces by invective and innuendo, based on the operations in Spain, Ethiopia and China reminds me of nothing so much as a story a foreign officer once told of an Arab company he had commanded. His Arabs were having trouble with their guns, many malfunctions. The officer made a careful inspection and found that in most cases it was due to mistreatment of the weapons, failure to keep them cleaned and oiled. Finally, he asked one of the native corporals irascibly,

"Why don't you men keep your guns oiled?"

The corporal replied with a straight face and with no show of insubordination,

(*Concluded on page* 80)

OLD TIMER

by HELEN WATERHOUSE

If any man in aviation has a better record than Jack Knight, bring him around.

Jack Knight's stride covered 2,400,000 miles in ships from DH's to giant Douglases.

CAPTAIN Jack Knight quit the airlines the other day after 20 years of sitting in the pilot's cockpit. He's back now in his office in Chicago's loop, with the high-sounding title of "Director of Public Education" for United Air Lines.

But somehow I have a hunch, after interviewing Jack just a few days before he announced his decision to quit, that sometimes he will throw a wistful glance out of that window, just as he did when he was employed in an engineering office in the loop in 1919 and a squadron of army planes flashed by outside.

Only on that other occasion, this slender wiry, dynamic young man threw down his blueprints and his ruler, and wired the post-office department that he was coming on to join the airmail service. From this decision, name and fame came to him as the man who put night airmail flying on the map, and who saved the day for flying the mail in this country.

So, the other day when I interviewed Jack at the completion of his twenty years and 2,400,000 miles of flying (a record of more flying than any other pilot in the world), my first question to him was, "When are you going to quit flying, Jack?" His answer, frankly given was, "Not till I get to be an old man with white whiskers. This is a fascinating life." And that's why I believe Jack will always be stealing away week-ends, and after work, to climb into the cockpit of a plane and negotiate the airlanes somewhere. For I can't somehow see him just sitting in an office in spite of his highfalutin' title.

Jack had motored up from his little farm down in the sand dune country at the tip of Lake Michigan for the interview. It's a legend that he hates driving in Chicago's loop—that the traffic bothers this man who is used to the far reaches of the heavens and limitless space. But now he had settled down in a chair by the desk, after shaking hands—rather reluctant to talk about himself. Suddenly he spotted a big blue and silver calendar on the office wall—

"That calendar's all out of drawing," he said. "The moon never looks that big—when you're flying. And the airplane never gets that close to it."

There was a twinkle in his black eyes—for after all this calendar was supposed to picture one of the giant airliners which he has been flying almost daily for the past decade.

And as to moons—Jack had done more night flying than any other pilot—and he, if anyone, should know his moons.

Jack settled down after that to the interview. I asked him to tell me some of the greatest thrills of his flying career. He answered that there are no longer any thrills to flying.

"Anything pertaining to thrills no longer pertains to flying in my estimation," he said. "And I'm glad that is true . . . The youngsters today will have a better chance to make a serious business of it. Why already they know almost more about aviation than we old-timers know ourselves."

"But the glory and the honor of that first night mail flight will always be yours," I said, for I wanted to have him tell me the tale of that epoch-making night in 1921.

For, modest and unassuming as he is, Jack Knight had taken part in one of the most spectacular flights in history as one of seven airmail pilots who volunteered to make a continuous day and night flight across the continent to prove that airmail was practical. He was one of a number of wartime pilots who had signed up for Uncle Sam's service and was carrying the precious pouches from one city to another entirely by daylight. Because there were no night schedules, it took 78 hours or even longer for a letter to go from coast to coast, and because of the slowness and the fact that only a few hours were thus saved over train service, Congress was getting jittery about voting any more airmail appropriations. And the chances were very slim on that February day when Jack made a name for himself, that any new appropriations would be voted at the next session of Congress which was only a few days ahead.

It was then, on February 22, that Jack and the other boys volunteered to do the thing which no one believed could be done—fly the mail cross continent by night.

There were no friendly beacon lights in those days, no intricate blind flying instruments, no weather reports coming over the radio to help the pilot over the tough spots. Jack Knight was flying the North Platte-Omaha daytime mail run at that time and had already made one trip from North Platte to Cheyenne that day.

"I signalled for the mechanics to pull the chocks out from under my ship," he began his story suddenly. "But it was not until 10:44 p. m., much later than I expected, that I got under way. A broken tail-skid on my plane had to be repaired first. There was a moon, but it was pretty well obscured by clouds.

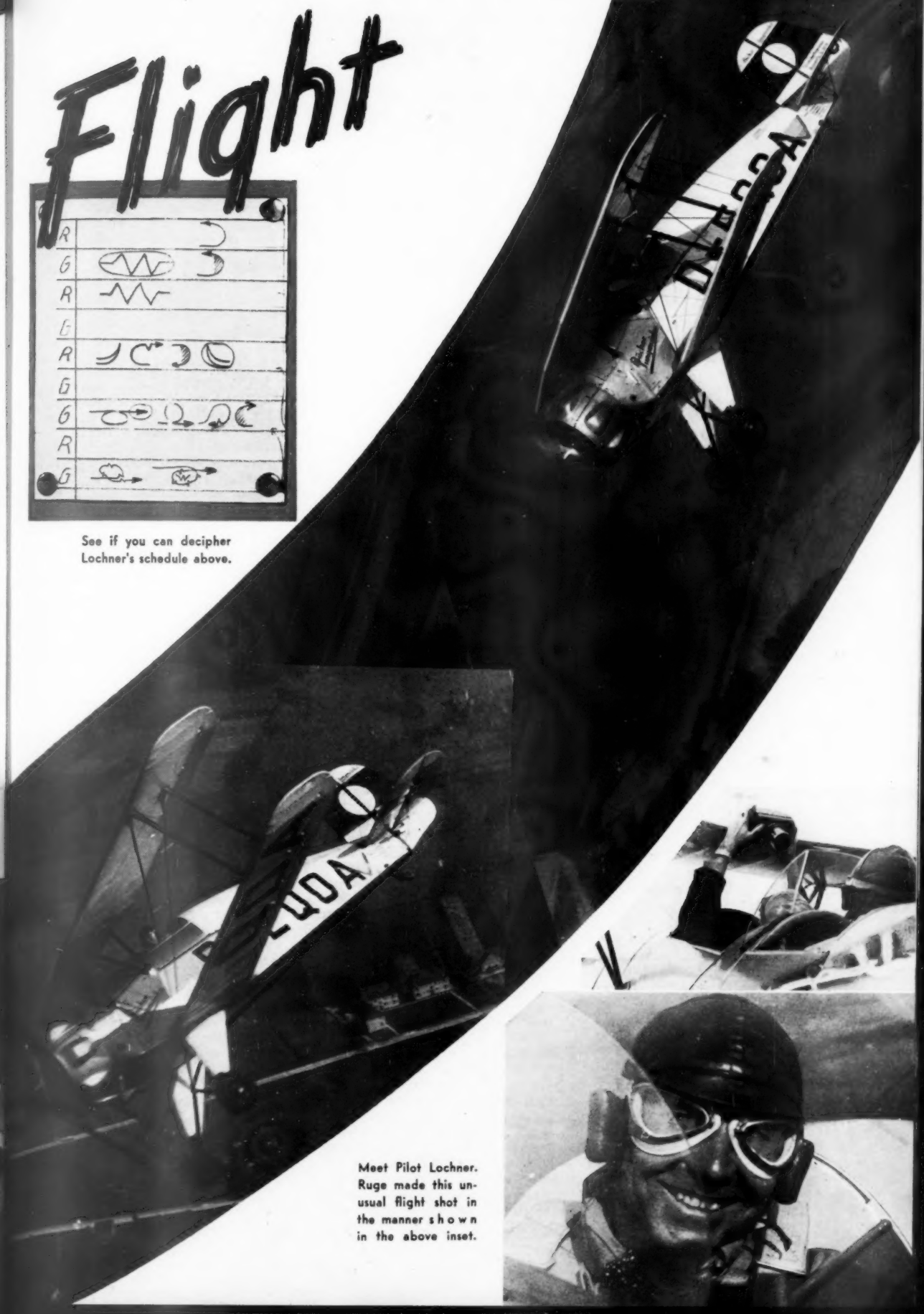
(*Continued on page 92*)

Stunt

RUDOLF LOCHNER is one of Europe's top-ranking stunt airmen. Willi Ruge is equally famed as a photographer. Combine the two and we have an interesting, unusual photo-feature well worth two of POPULAR AVIATION'S already crowded pages. By an ingenious combination of a few of Photographer Ruge's breath-taking series, Lochner's rugged Bucker *Jungmeister* is shown zooming across these pages into an Immelman turn. This maneuver was just one of a lengthy repertoire of stunts Lochner had scheduled on his chart on the opposite page. The Immelman is charted in the second figure from the left, fifth line from the top. Lochner tacks the chart on his instrument panel, has also scheduled loops, rolls, spins whip- and hammerhead-stalls. The Immelman shown here starts with the dive from the top of the opposite page, pullout, slight slip directly below, zoom into a loop, then a half-roll to level flight back across the page.

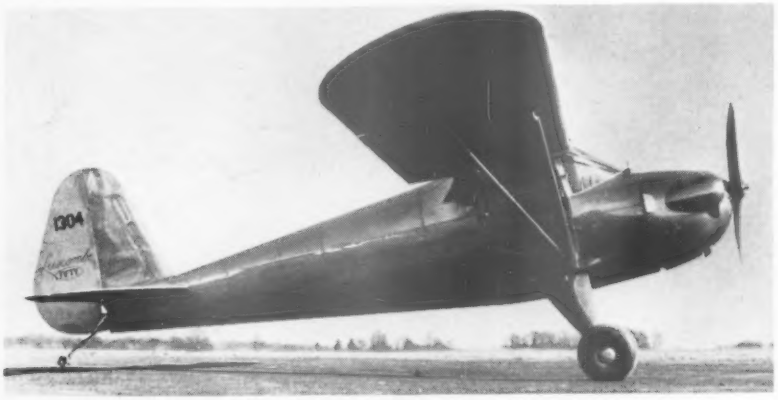
Flight

See if you can decipher Lochner's schedule above.



Meet Pilot Lochner. Ruge made this unusual flight shot in the manner shown in the above inset.

Introducing the New Luscombe "50"



Donald Luscombe hopes to crack the lightplane market with this all-metal monoplane. Powered with a 50 h.p. Continental, the Fifty has yet to get its A. T. C.

ALTHOUGH he has yet to secure his Approved Type Certificate at this writing, Don Luscombe, designer of the Luscombe *Phantom*, recently announced the completion of the first model of the Luscombe *Fifty*. Powered with the new 50 h.p. Continental engine, it is expected to compete with present-day lightplanes now on the market.

A prominent feature of Luscombe's new ship is the fact that it is of metal construction with fabric-covered wings. Luscombe long has planned to enter the airplane market with a stamped-out metal ship that can be produced and sold far more reasonably than the present standard airplane. This, however, is merely looking ahead to a future that will offer enough of a market to make mass-production of airplanes economical.

Wing span of the *Fifty* is 34 ft. 6 in. Length overall is 19 ft. 7 in. The ship carries two persons side by side and has a gross weight of 1,103 lbs. with a useful load of 493 lbs. With a gas capacity of 15 gals., the new engine burns 3½ gals. per hour. Top speed is 102 m.p.h., cruising speed 90 m.p.h. and range is 375 miles. All these figures are supplied by Luscombe.

"Telebrineller" Is Developed

A LIGHTWEIGHT portable Brinell instrument that can be carried easily right to the job is said to simplify metal hardness tests in the field, remote from laboratoroy facilities and around industrial plants.

According to the manufacturer it can be used in close quarters and can be applied to parts and equipment the size of which have, heretofore, made testing difficult, expensive and sometimes virtually impossible.

Known as the "Telebrineller," the instrument was developed by one of the oldest and largest railroad rail maintenance organizations in the United States to check and control heat treating of rail ends on the right-of-way. Its simplicity, convenience and the ease with which it can be carried are indicated by the fact that the combined weight of the outfit and carrying case is only 6½ pounds. No training or previous experience, it is claimed, is necessary to operate it accurately.

In addition to its more obvious uses in many types of plants throughout the metallurgic industries where it is used both in receiving rooms to check deliveries of raw materials with specifications ordered and in routine production control it also has a number of uses in plant maintenance work.

A number of oil refineries are said to be employing it to test parent metal adjacent to welded joints in alloy steel pipe in high pressure and hot oil lines which welding and vibration are claimed to harden beyond the safety point

The outfit is composed of the Telebrineller instrument proper, a bar of known hardness, a microscope with a scale etched in its focal plane and a slide rule, packed with extra test bars and impression balls in a small case.

The instrument itself consists of a metal tube supported in a soft rubber head, and a rubber spacing block, the tube holding the bar of known hardness. An anvil in the top of the rubber head rests directly on the bar. Below the bar an impression ball, secured in a narrow aperture in the base of the head comes in direct contact with the metal to be tested. The spacing bar holds the bar in a clear area for each test.

To make a test, the instrument is held against the specimen and the anvil is struck a sharp blow with a 3 to 5 pound hammer. The impact is transmitted through the anvil to the bar, then to the ball and on to the specimen. Force of the blow is said not to be a factor, the diameter of the impression in the bar and in the specimen being, in any case, relative to their individual Brinell hardness number (BHN).

END

"I Covered Aviation"

WE had a letter one day from a woman in California who wrote to the city editor saying that she was sending under separate cover the ashes of her departed father. The deceased was an old seafaring man and his last wish was that his ashes be strewn over the Atlantic Ocean. "Would we arrange to have this done," the letter requested. Naturally, there was an excellent story here, so we engaged a plane and our religion editor furnished a clergyman to make the flight. Fifteen miles out at sea, the committal was read and the ashes were dropped. My eye-witness story was carried on the J wire of the Associated Press that night. . . .

* * *

A RIDE in Dick Byrd's South Pole *Condor* was another treat. Harold June did the flying on a 90-minute hop. That afternoon we ran a copyrighted story revealing some of Dick Byrd's innermost plans on his forthcoming expedition. The Admiral was a bit wrought up about the story and still thinks it was born on that 90-minute flight. The funny part of it was that the hop actually provided about two paragraphs of a two column story. . . .

* * *

A COUPLE of years ago blind flying was coming into its own. We covered instrument flights from a variety of angles. American Airlines provided what was perhaps the best story. They had a specially-equipped Fairchild with a closet compartment from which their pilots guided the ship entirely by instrument and radio beam. Instructor Bill Lester gave some newspapermen a little time to show how instrument flying really worked. Each man was given a chance to make his own flight and Lester, in the forward compartment kept a record on his chart. I can recall that my course looked like some scribbling on a memo pad during a phone conversation. . . .

* * *

ANOTHER flight that provided a bit of interesting copy got me out from behind my typewriter into the northern skies. The old crate was well loaded down with some sort of "special" mail and I was covering more of the mail than I was the story. The old ship shook and rumbled something fierce as we headed north into country I didn't particularly relish. The going was plenty slow (I don't think that ship could have hit 100 m.p.h. with a team of mules hooked on. Anyhow, I was also supposed to get a yarn on that line's operations.

After the first 200 miles I gave up my seat to a couple of mail sacks and arranged to get aboard the same ship on the returning afternoon run. The same pilot beamed at me that afternoon. Two other passengers were aboard and the three of us enjoyed a round of conversation before casting off to sleep. An hour later we were directly over some

(*Concluded on page* 97)

LITTLE Flower

by JAMES FARBER

Aviation has a great champion in Fiorello LaGuardia, New York's fiery flying mayor.

AT 6:50 p. m., Saturday, November 24, 1934, the Chicago-to-Newark TWA liner rolled to a stop on the tanbark of the world's busiest airport. The shades of evening had fallen on the drear bottomlands and Jersey swamps that skirt the fabulous city of Newark and provide limitless space for the sprawling airport.

A hostess hurried up to the co-pilot.

"There's a passenger," she said, "who won't get off. He won't budge."

The pilot forgot his weariness. "What's that you say? Why won't he get off? This is the end of the run. Everybody's got to get off."

"He says," the girl replied, "that his ticket reads 'Chicago to New York' and that he intends to be taken to New York by plane."

"Well, I'll be . . ."

And so it turned out. The pudgy figure still seated in the airliner—and with his safety belt still hooked—glowered fiercely at those who sought to dislodge him. A newspaperman stuck his head in the door, listened to the sharp exchange of words, whistled, and raced for his cameraman.

"I am LaGuardia, Mayor of the City of New York," the pudgy man told officials. "But I am also a citizen and a passenger on your line. My ticket was sold to me for New York and that's where you'll take me."

It was a beautiful impassé for the perplexed pilot and hostess. Meanwhile the reporter stuck his head in again, asked: "How about posing for a shot, Mr. Mayor?"

And the Mayor, whose penchant for pictures of himself in any kind of pose adaptable to publicity purposes is never dormant, snapped out, "Certainly. Take all you want." Meanwhile H. H. Gallup, airport field manager, was summoned. Gallup did some quick thinking. He took the controls from pilot Dean Burford, and personally flew the recalcitrant Mayor to Floyd Bennett Field.

If the United States still needs the perfect five-cent cigar, then aviation here can do with a few more such sluggers as Fiorello H. LaGuardia to go to bat for it. He is mayor of the nation's most important city. He rivals and towers above Jimmy Walker as that great municipality's most colorful chief executive. Reams can be written about him. Reams will be.

But this part of those reams concerns itself with a review of the two-fisted tactics in behalf of the obstreperous Italian-American mayor's most cherished hobby: aviation. Your correspondent has delved the subject deeply and trusts you will be able the better to form your own conclusions about the effectiveness of this aeronautical Don Quixote.

The facts will be given you. You can take them or leave them, and if you take them—for better or for worse.

Fiorello La Guardia has been in one long series of fights from just about as early as he can remember. He has always been able to find a cause to attract his Quixotic lance. He hasn't the slightest objection to engaging in several fights at one and the same time and odds mean nothing to him.

Perhaps this is a natural result of the first vivid impressions of his life: on the Southwestern ranges when times were hard and the good earth had not been licked yet by the legions of pioneers preceded by other legions. Born on Varick St., New York, La Guardia was taken West by his father, an Army bandmaster of the Eleventh U. S. In-

fantry to Fort Prescott, Arizona. Life here was rugged. It toughened the youth who was small for his age. It no doubt contributed to his permanent ability to express himself with overwhelming clarity. He is, today, a complete master of invective and anathema. There was a time, even on the floor of the United States Congress, when "lousy" was sprinkled throughout most of his speeches.

In 1902, at the age of 20, he got into the government service and into his first major scrap. As a clerk in the consul general's office in Budapest, he sounded off against discriminations in favor of European royalty. In 1904, as consular agent at Fiume, he insisted that notables and bigwigs be required to take medical examinations before being allowed to enter the United States. In the same year he tangled with the Archduchess Marie Josepha of Austria, who filed a complaint against him when he refused to keep a crowd of immigrants waiting for her appearance in Fiume. He lost both these battles, although the system of pre-entrance examinations for all aliens was adopted by Uncle Sam—belatedly—in 1924.

Meanwhile, young Fiorello was out of a job. But not for long. He got in a job as an interpreter at Ellis Island, and began to pay his way through law school. He hated titles and memories of his skirmishes with pompous aristocracy rankled him. When the 106th Infantry made Queen Marie of Roumania, an honorary colonel, a few years later, his voice was heard to high heaven: "Isn't it bad enough," he shouted, "to let Billy Mitchell out of the service without making this woman a United States Army colonel?" He filed formal protest of the "outrage" with War Secretary Harry Davis.

People were beginning to find out that the literal meaning of La Guardia's Italian first name, Fiorello—"Little Flower"—was a most deceptive appellation. Many believed he should be called "Little Panther."

He was admitted to the bar in 1910 after graduating in law from N. Y. U. That dates his enmity for Tammany Hall and his never-ending delight in pulling the Tammany tiger's tail. The young lawyer was defeated in one of his first cases. He blamed Tammany. From then on—the tail twisting. He became a Republican election captain in his own political district—heavily Italian in population. He was spectacular—and very popular. Governor Whitman, in 1915 made him a deputy attorney general. He served until early in 1917, then surprised the socks off the Old Line leaders by grabbing the congressional nomination. He further dumbfounded them by beating the strong Democratic machine to a frazzle.

The day the Little Flower walked into Congress as a member, President Wilson had called a special session to declare war. La Guardia voted enthusiastically for war and the selective service law. Then, in a fanfare of publicity, he declared that since he was willing to declare war, he was willing to fight it. He accordingly left Congress and enlisted. He had been learning to fly. He was made a lieutenant, then a captain, then a major. He was sent to Italy; helped bomb the Austrians; raised hell when he learned that Army contractors were sending structurally weak planes to the front; threatened to go back to Congress long enough to prosecute; the contracts were cancelled; he became thoroughly disillusioned about the "lofty" ideals of war. His aide-de-camp was Lieut. Albert Spalding, great violinist. King Victor Emmanuel and General Diaz, reigning Italian war hero, feted this inimitable pair.

Meanwhile, the people back home re-elected him to Congress. He came back and delightedly posed in uniform. Hating titles, he was now universally hailed a.. The Major. His enemies said he was a rabble-rouser, demagogue, Midget Mussolini, a Little Corporal, Midget Messiah of Manhattan, a Roman Candle Gone Haywire, etc., ad nauseam.

"Holy cats! Don't look now, but we forgot that aquaplaner who asked us for a hitch!"

When Al Smith left the Board of Aldermen to occupy the governor's mansion at Albany, Republican LaGuardia took his place. Things began to hum. The new incumbent denounced the state legislature for expelling Socialists. The aggrieved solons retaliated by passing an act raising all New York City aldermen's salaries except the president's, to $10,000 a year. LaGuardia's remained at $7,500. When he went out of office, his pay was doubled. His Washington landlady had once said: "Some people think he's noisy. I think he's just hearty." Noisy or hearty, he wins more friends than enemies—and faster.

During the Jimmy Walker era of bathtub gin, LaGuardia aspired to the mayorality. He tried to muscle in on the Walker re-election campaign but the redoubtable Jimmy, with his charming, careless impudent and colossal mismanagement of the city's affairs scored a smashing victory. The Little Flower, unperturbed and probably biding his time, blithely went back to Congress.

Meanwhile, the playboy mayor had gathered himself several implacable enemies: Franklin D. Roosevelt and Al Smith. Judge Samuel Seabury was designated to plant a mine under the Walker regime. The famed investigation that followed began with the scandalous ouster of Sheriff Tom Farley, exposed the vicious, rotten Walker administration for what it was, then exiled the red-faced, debonair Jimmy. Tammany was nearly wrecked, too. It paved the way for LaGuardia.

In a rousing, smashing three-cornered fight, the Little Flower sank Honest Joe McKee and Tammany Rubber Stamp John O'Brien, November 8, 1933, for the City Hall No. 1 job. Walker had said: "This job's a headache." LaGuardia later said, thinking of thousands of unfortunate citizens he wanted to help, "This job is a heartache." He regarded the 300,000 unemployed as a pitiful ghost army.

And so to the startling saga of a Flying Mayor going to bat for aviation in the Nation's greatest metropolis.

The most spectacular combats into which the Mayor plunged were (1) his tooth-and-nail battle to make Floyd Bennett Field the peer of the eastern seaboard, (2) his Gargantuan struggle with the anointed of the Army for permission to make good and logical use of Governor's Island as an air base and (3) his dogged fight for the airmail. Embellishing these phases of his two-fisted interest in aviation has been his unflagging campaign for airports and suitable aeronautical legislation.

On December 4, 1934, La Guardia shouted: "New York must no longer be humiliated by seeing all its passenger and airmail traffic go to a nearby state." He meant Newark airport. Newark's Mayor, Ellenstein, declared himself unworried. But the first gun had been fired in the bitter controversy. LaGuardia obtained a five-year lease on Curtiss airport, North Beach, Queens, for one dollar a year plus $28,000 annual taxes. The city had an option to purchase this 178-acre field in five years for $1,500,000. Opening of the Tri-Borough Bridge brought the airport within eight minutes of Manhattan. A month after getting he lease, the mayor dedicated the tract and buildings. TWA engaged hangar space. LaGuardia, enthusiastic, told the crowd at the dedication: "Nothing can stop aviation here. We are not dreaming, we are planning." And how!

Floyd Bennett Field and the Municipal airport were now linked. Mayor Ellenstein let go a salvo at his rival: he lambasted Bennett as fog-bound. La Guardia said, "Newark has everything but a good airport." In January, 1935 Jimmy Doolittle broke Eddie Rickenbacker's transport plane record. By mistake, he handed Mayor Ellenstein a packet of three California oranges, con-

(*Continued on page* 84)

AIR TRAVEL a la 1940

by CHARLES J. BAUER

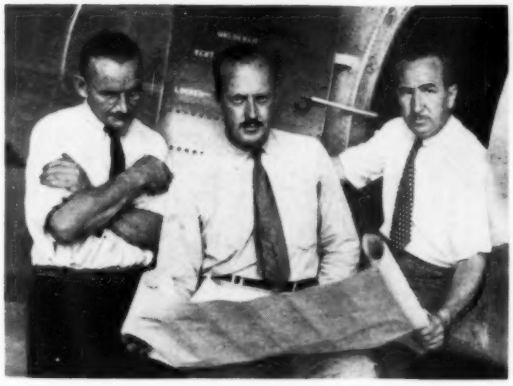
ACROSS the aisle fellow passengers at their card game are having a gay time of it and you reflect as you look on from your newspaper, that since leaving the controls to complete a foursome, the pilot has become the life of the party.

Were anyone perturbed by his diversion from flying the ship, his fears are groundless, for it is doing an excellent job of flying itself—and to all appearances the scene is one aboard a streamlined coach or a yacht on a glassy sea.

The muffled vibration of the engines is dulled by the airtight sound-proofed wall, and through the frost-flecked amber windows stream shafts of sunlight. Leaning back luxuriously, you wonder what Jules Verne, were he alive, would think of it.

For you are in a stratosphere plane, cruising at 480 m.p.h., eight hours out of San Francisco and with New York city but two hours behind! You are ten miles above the sea and seven miles clear of a storm chopping that sea into great waves. It's not safe down there for aught but big liners. In another five hours you will land at Croydon airport, England. . . .

This is a glimpse in the year 1948, a short decade from now, but a mere moment in the pattern of eternal change.



Uncle Sam is interested in the stratosphere for military reasons. But results obtained by Maj. A. W. Stevens, Capt. H. G. Armstrong and Maj. Carl Greene (above) will do much for airline transportation.

From where we stand now the picture may seem fanciful to the skeptic, but hard-headed experts paint it with confident strokes.

Just last summer the Army Air Corps made the first high-altitude flights in a hermetically sealed cabin plane, proving conclusively the practicability of the "sealed-in" idea, previously confined to submarines and balloon gondolas. After test flights from the Lockheed factory on the west coast, over California mountains, the world's first stratosphere plane was flown to Wright Field, Dayton, O., at altitudes of between 18,000 and 25,000 feet.

The army is not alone in these experiments. Glenn L. Martin of Baltimore has just completed tests on a substratosphere cabin structure intended for use in Atlantic nonstop service, and four-motor passenger ships under construction by the Douglas and Boeing aircraft companies are designed for sealing against stratosphere rarity. Engineers of all these organizations are bending to the task of perfecting supercharged engines and supercharged cabins.

Very early in aviation development, engineers recognized two basic problems to be solved before high-level flying could be practical. Ordinarily aircraft engines have a definite "ceiling" above which they are powerless to lift a plane. People, too, have a "ceiling" at which they suffer physical and mental distress.

Both problems are now being solved by a single device, the supercharger. This is described as an air pump by means of which thin stratosphere air is compressed for engine consumption and for cabin conditioning to approximate

This is the Air Corps' Lockheed "strato-laboratory".

Looking forward toward the cockpit of the Army's Lockheed stratosphere ship. Pressure instruments are at the left. Emergency oxygen tanks are at the right.

the density of sea-level atmosphere. The army's turbo-supercharger is vital to its stratosphere ship.

This craft is unique in many respects. Maj. Carl Greene, designer, says that it will fly *over six miles high*, the occupants enjoying the comfortable pressure and temperature of sea-level. More remarkable still is his assertion that the plane will take you up this high in 20 minutes, or about as fast as an express elevator.

Fore compartment is divided from aft by a curved metal bulkhead, into which clamps a door. In flight, one compartment may be maintained in a widely different altitude condition from the other. This arrangement is of value in experiments or in an emergency requiring one or more passengers to "bail out," in which case the rear compartment serves as an airlock. Lettered on the inside of the exit is: CAUTION—DO NOT OPEN DOOR WITH PRESSURE IN CABIN EXCEPT IN EMERGENCY.

Martin found that sealed cabins stretch under the required inside pressure of 11½ pounds per square inch, in repeated tests with tape measure bands bracing and construction were changed and the stretching ceased. Porthole windows of transparent composition blew out sometimes—their thickness was increased to five-eighths of an inch. To filter excessive ultra-violet and infra-red rays of high altitudes, the windows are of amber. The outside chance of a window breaking under pressure called for development of a metal shield, or gasket, that clamps over the opening in a few seconds.

Pioneers of the stratosphere are the daring flyers who pushed the world altitude record up year after year, at first in open cockpits or gondolas, later with special protection. Men have endured bitter cold and oxygen starvation as far back as 1862, when the Englishmen, James Glaisher and Henry Coxwell, rose about six miles in a balloon, barely surviving.

How life reacts in the stratosphere is now being studied in army laboratories under direction of Capt. Harry G. Armstrong. He and his assistants are interested primarily in physical and mental effects of high flying. Through glass windows in altitude chambers, operators observe behavior of small animals under low temperature and pressure. Rabbits are found to withstand high altitude better than humans, going without discomfort to 30,000 feet, and sometimes surviving at 45,000. Humans are affected above 15,000 feet.

Captain Armstrong himself went up as a passenger to 35,000 feet, using oxygen after 25,000. From notes he made in ascending, and again the descent, discontinuing oxygen at 30,000 feet, he found that handwriting becomes wobblier and impressions blur, as oxygen lessens.

The late Wiley Post thought that man could best fly in the stratosphere attired in an airtight suit and helmet supercharged with oxygen. Post's idea was used last June to set a new world altitude mark for airplanes, 53,937 feet—over 10 miles. Flt. Lieut. M. J. Adam of England looked like a deep-sea diver but his suit was proof against extreme cold and oxygen-want.

Astronomic observation from the stratosphere may become common following the discovery, from photographs of the eclipse last June, that the solar corona is far more extensive than was supposed. In addition to the long flaming streamers, the corona is found to consist of a fairly uniform fire blanket about a million miles deep—more than the entire diameter of the sun.

The pictures were taken from a plane five miles above the west coast of South America, by Maj. Albert W. Stevens, holder (with Capt. Orval Anderson) of the world altitude record. In November, 1935, the army officers ascended in a balloon 72,395 feet above the Black Hills.

"If you go up on Mt. Washington, Pike's Peak or Mt. Shasta," says Major Stevens, "and look down into the valley, you will find the earth shrouded in dust

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Parachute Man

PINCH hitting for a dummy! Swell business as long as you clear the airplane and don't get hung on the tail.

But if you happen to pull the ripcord too soon, and get caught, then it's just too bad.

In terse business-like sentences, Leonard Moore, who has stepped out into space and pulled a 'chute probably more times than any other one man, described for POPULAR AVIATION the sensations of a delayed drop parachutist as he falls through the air.

Moore makes his living testing 'chutes for a parachute company in Cincinnati. He tests them from all kinds of heights and in all kinds of weather conditions, even at below-zero temperatures.

"We used to always dummy test the 'chutes," he explained. "Then we decided to 'live test' every one. It was too hard work chasing a 170-pound dummy 'round the field."

The slender, wiry man who used to work in a furniture factory, and who started jumping only three years ago, thinks nothing now of stepping off into space at 10,000, 5,000 or even 500 feet.

"Course it's a pretty good rule that when you can see the limbs on a tree, it's time to pull a 'chute," he added, laughing.

"There's no feeling of falling; there's more a feeling of being suspended in mid-air, or of floating.

"You don't suffer from shortness of breath and you have no idea at what speed you are traveling.

"If your head is down as you fall, and you're pretty well streamlined, you sometimes go as fast as 240 m.p.h. You expect a pretty hard jerk and you generally get it.

"And on a delayed jump, you have to watch the ground very closely to know at just what last moment you can pull the cord. You should plan to come in for a landing with your knees slightly bent to cushion the fall.

"I believe that most of us who are in the parachute-jumping business are in it for the kick we get out of it, rather than the money, for there's very little money in it," added Moore.

"Take a spot jump at the National Air Race, for example. If you don't hit the circle you don't make a penny. The group jump last year was a lot of fun. There were ten of us lined up with the seats removed from our plane. One man is placed in the aisle as a 'spotter.' When the spotter yells that we are over the right place in the field and it's time to jump, we all see how quick we can pile out of there.

"Course it's not all pleasure," admitted Moore. "It gets to be work after awhile and I tell all the boys who say they want to be parachute jumpers that they

(*Concluded on page* 76)

Focke-Wulf's CONDOR AIRLINER

ONLY a few years ago, the advent of American commercial aircraft into the European market dealt overseas manufacturers a blow that they knew they would have to do their utmost to recover from—or fail entirely. The result, then, has been a veritable flood of entirely new designs, most of them easily compared to a standard American ship. The Focke-Wulf *Condor* is the latest of Europe's modern airliners. Powered either with four American or foreign engines, the *Condor* can carry 26 passengers and four crew members. Powered with American *Hornets*, the *Condor's* top speed loaded is 249, cruising is 238, landing is 67. Fully loaded, the *Condor* is said to have a cruising range in still air of 1,550 air miles.

Pampas Pilots

True to the Latin legend, his guitar is his pastime.

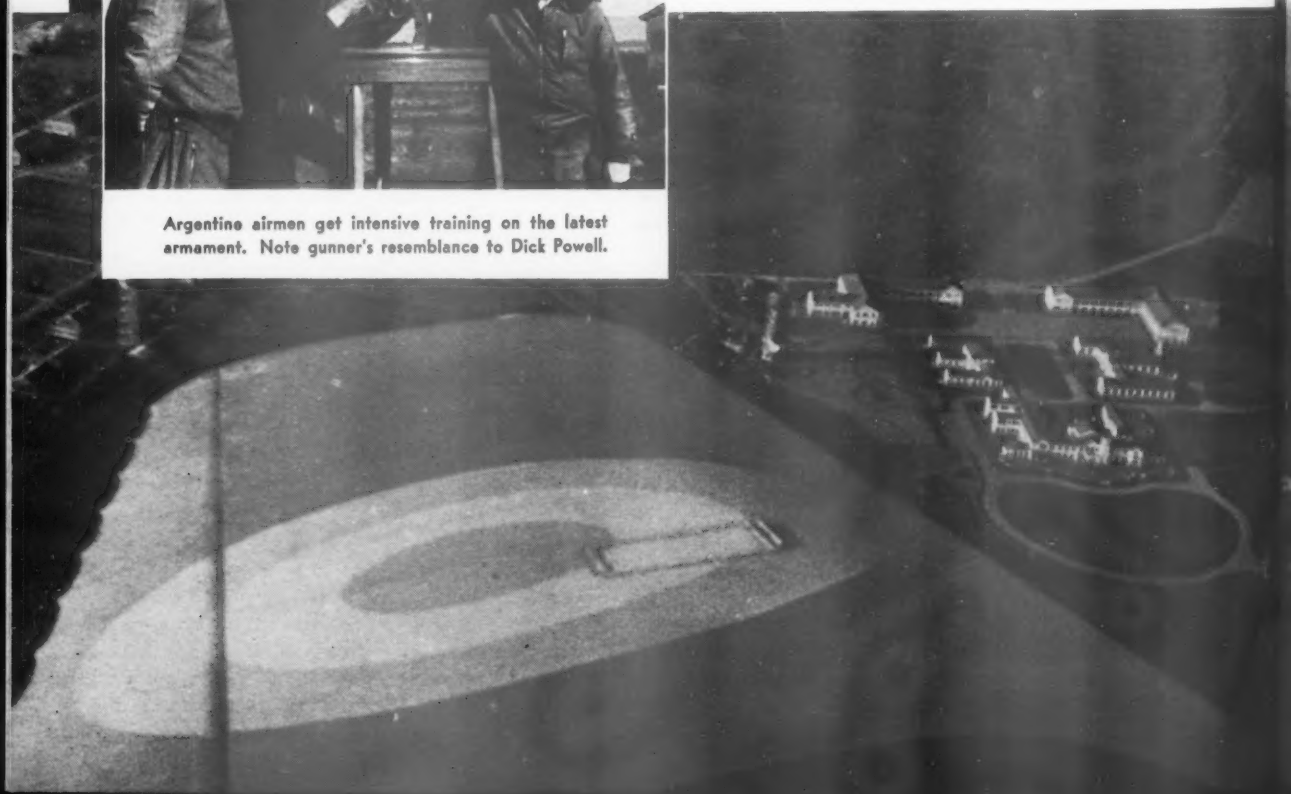
ARGENTINA as a military air power is not likely to be a world threat, in this generation at least. But that does not mean that South America's "boot" republic is at all behind in her military aviation. The photographs on these pages offer a rather general picture of what's going on in that hardy little republic, aeronautically speaking.

Most of the pictures on this and the opposite page were taken at the military air bases at Cordoba and El Palomar. At these two bases the majority of Argentina's military airmen are trained. In addition, Cordoba boasts a modern, well-appointed military aircraft factory. All the light bombers shown here are products of that factory. Thus cadets have the peculiar advantage of being more or less trained at an aircraft factory.

Though Argentina's air force is far from being among the world's largest, it is nonetheless a well-

Argentina's modern military flying school at Cordoba (below) is one of that nation's two main air bases.

Argentine airmen get intensive training on the latest armament. Note gunner's resemblance to Dick Powell.



Above are cadets from El Palomar on training flight.

rounded military air organization. All army aviation is under General Verdaguer. He has command over Argentina's aircraft factory, three military air bases, aviation school, two reconnaissance squadrons, two fighter squadrons and two light bomber groups. Naval aviation is under the direction of the Minister of Marine. Argentina's army and navy use American aircraft extensively, present makes in use including Vought, Grumman, Curtiss, Douglas and Consolidated.

The light bomber below is from the Cordoba factory.

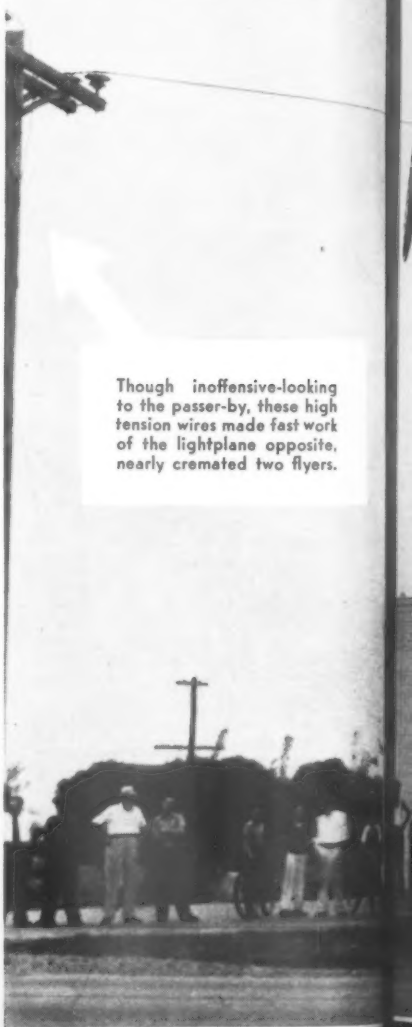
General Verdaguer (above) holds sway over Argentina's military aviation, including both school and factory.

This Army bomber hooked a high tension line.

Follow any high tension line to where it joins another and you'll find an airport. Broadly, that is the situation in this country today. An able pilot, the author discusses an obnoxious situation.

HOW many of you readers have struggled in to one of the "average" airports anywhere in this country, with a sloppy rain beating against the windshield, with visibility down to one-half mile, perhaps at dusk or in darkness, with no time to take from the map case and review the airport guide or sketch describing the field in question? Or dropped down through an overcast near an airport not entirely familiar to you, with the radioed assurance of the man in the control tower that there was a 200-foot ceiling, but with no assurance that a 220-foot obstacle might loom up between the breakthrough and the field? Or how many have heard these words from a pilot: "Whoosh! and the water tower shot past my wing, and then the high tension line, as I settled down to land."

Perhaps those that have done so have given more than just a thought to the current situation in aviation where there are all sorts of rules, regulations, laws and ordinances designed to protect the flyer against himself and other flyers, but few designed to protect him against the thoughtlessness, greed or maliciousness of the non-flyer, or against preventable conditions for which the flyer is not responsible. The still-remembered tragic crash of an airliner in Florida when it struck newly-placed wires adjacent to the field on a take-off was just one of the many examples of the result of a *lack* of regulation in an activity which is otherwise regulated to death.

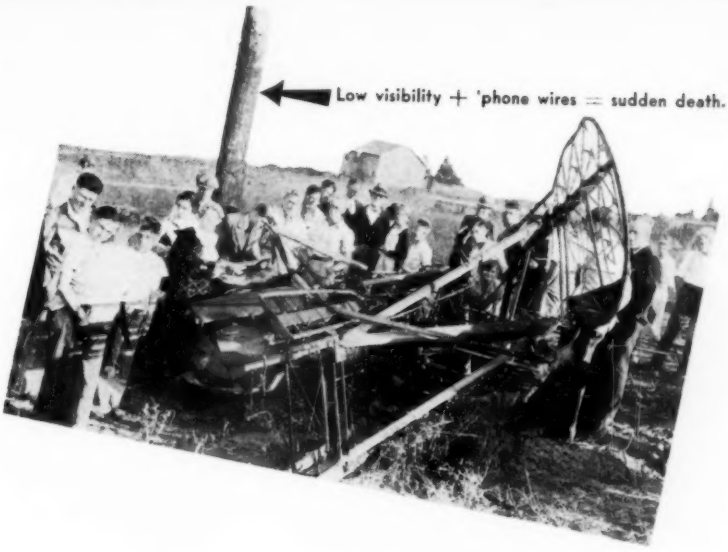


Though inoffensive-looking to the passer-by, these high tension wires made fast work of the lightplane opposite, nearly cremated two flyers.

The arrow points to a dangerous obstruction on a modern Army Air Corps base. To a pilot approaching in bad weather, that tank might easily turn murderer.

WE NEED

★



Low visibility + 'phone wires = sudden death.

This article is inspired by three things. First, the writer has just finished digesting the new airway traffic rules of the Bureau of Air Commerce. Second, he just wound up the estate of a close friend whose landing gear hooked a high tension line smack up against an otherwise fine airport several years ago. The new regulations are designed to protect the flyer against himself and other flyers, but little had been done to protect my old pal of the Jenny days against the acts of others.

The third inspiration behind this article is the aptly worded annual report of the president of the National Association of State Aviation Officials. "I believe," he states, "it is conservative to say that one-fifth of the total available landing area of the airports of America is negated by obstacles outside the airports themselves." So, we can rightfully infer, we are not only wasting lives, but property as well in the form of unusable airport areas. "Trees, smoke stacks, tanks, pole lines, high tension towers, buildings of all sorts and descriptions limit fields and endanger the public safety with tolerance.

The words "with tolerance" are significant and true. Such tolerance generally exists because once a fairly good pilot has become familiar with obstructions around the field he loses his fear of them. A transient pilot coming into an airport between or around obstructions is content to grumble about conditions and then fly off instead of flying off the handle. A flyer who *doesn't* miss the obstructions can't usually kick—not in this world. Besides, there are many angles to the apparently easy job of "doing something about this obstruction business".

Investigations into the subject of airport obstructions revealed some interesting facts. Foreign countries for the most part have zoned their military, and commercial airports, also their private ones, and these zoned areas are administered under the central government. Few states in this country provide for condemnation of obstructing property where it applies to aerial safety. People the

A loaded airliner took off from Daytona Beach, Fla., recently. A power company had just strung a line along the field. The mute picture below tells the rest.

ED A LAW!

Says T-2003

The writer is a prominent authority who, because of his position in the industry, must remain anonymous.

world over soon become callous to peril, and many people in this country will build theirs in the shadow of Mt. Vesuvius. Sometimes the whole trouble with the obstruction situation is one of economics; someone trying to make a living in the flying game without the means to provide an absolutely foolproof field. Sometimes it is political; a municipal field purchased where it nests in a charming boundary of high tension lines, hills, buildings and high trees, because someone who was politically "in right" had the airport site to sell at a good profit; or a field will be purchased or accepted with full faith that existing obstructions will be moved, but the cost of moving, often jacked up by the "in rights" later proves prohibitive.

The layman is apt to wonder why "the city or county doesn't condemn the obstructing property around a municipal or county airport, paying a fair price for it and then zone the area so no one can erect more obstructions". That solution sounds simple but there's more to it than appears on the surface.

We'll first take the case of the privately-owned or operated airport. Can the non-flying public (in this day and age still in the majority) be expected to endorse a bill where their taxes pay for the cost of removing an obstruction which will benefit a small group of flyers or a company which is operating an aviation business for profit? Take the specific case of one privately owned airport serving a small far western city. "This field," the operators told me, "is the only good one close to town. In fact it's within easy strolling distance from the center of the town's population. We live across the road where we can keep an eye on things. The nearest other available site would be four miles farther out. When we leased the field we chopped down many obstructing trees and got the county's cooperation by interesting the relief organization in *providing free firewood for the county poor!* There remains only the telephone lines paralleling the length of the field. Ordinarily this is bad only when cross-field landings are necessary. There were 55 days last year when they were. Many of the pilots flying from here are students or novices who are a bit dubious about attempting cross-wind landings, so they head into the wind but across the field and hope they won't hit the wires or poles. The telephone manager for this section is on all the civic bodies and he has a lot to say about civic improvement, but he'll do nothing about removing the obstruction, although I pointed out to him the danger to life, limb and property."

To play fair, the telephone official in question was interviewed. He showed his side of the case. "Our lines were there first, when that airport was a pasture. It would cost $800 to shift those poles and wires. Obviously, if these air people are running a private enterprise they can't expect my company to foot the bill where they alone or their customers will benefit."

Well, it will be several years before the airport operators can afford to pay $800 for the improvement of their field. They live across from the field and it would be impracticable to shift their location to the next nearest field several miles away. Their business couldn't stand it. So meanwhile the boys and girls will go dodging the poles and wires about 55 days each year.

But how about the publicly-owned airports of America? What can be done to render them safe? And how bad is the situation with such fields? Can the authorities arbitrarily remove obstructions? Can they even do it legally?

To get the big picture we must realize that modern flying machines have outstripped the fields they are landed in, just as modern automobiles have far outstripped the roads on which they are driven. Everywhere there is concern over the inadequacy of existing fields. So much so that many engineers and operators have a hunch that the solution is water-based aircraft for the big airliners. So the problem is becoming more acute; it is not one which will work itself out in a couple of years. There was much talk six or more years ago of the airliner which would stall down slowly out of the sky and land in the proverbial back yard, but such an airliner is not likely ever to be developed. Each year the public (yes, and the flying fraternity itself) is astonished by the latest in air giants, and these air giants are proving themselves practicable. Except that there are fewer and fewer airports in which they can land with all-around impunity.

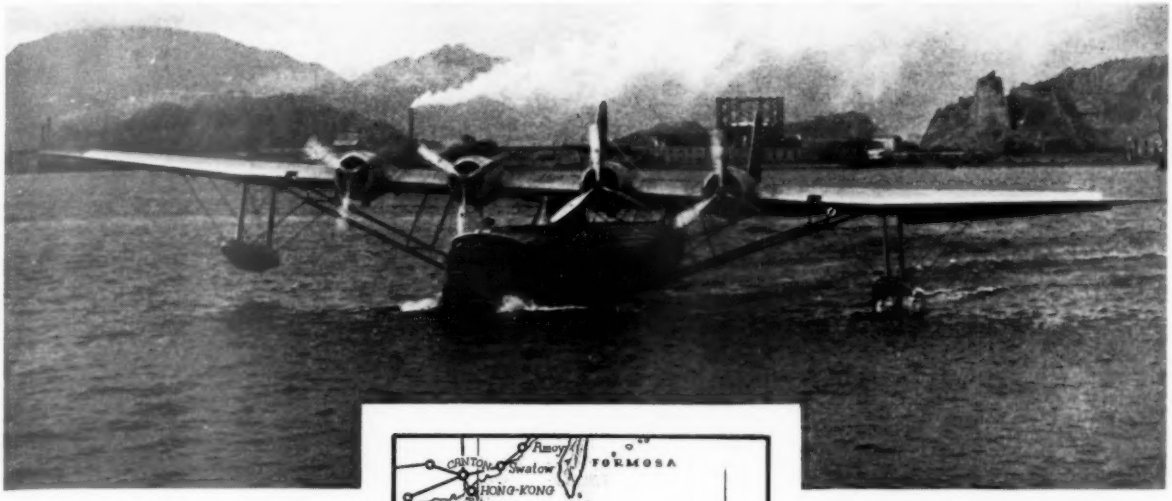
Now, there is something that is called the law of eminent domain. This is the law which gives a sovereign power (the government or a state) the right to condemn at a fair purchase price to be determined by a court of claims, such property as is required to be so condemned for the public benefit. Supplementing such law must be a zoning law which zones the area around existing airports so that no one can later erect any structure which may prove an obstruction to airplanes flying in or out of the airport. The latter law is comparatively easy to put into effect, and many municipalities and counties have done so and will be free for some time to come from the presence of hazardous obstructions around their airports; until it becomes necessary to expand these ports to keep pace with the new airplanes. Then there will be felt the need of a law whereby through due legal process existing obstructions can be removed from the newly acquired additions to existing airports. There is a difference between existing *obstructions* and existing *airports.*

While air commerce is an interstate activity, the writer believes that laws of eminent domain must be matters for each state. Such laws are not easy to pass. It is generally necessary first to show that "the public" and "the people who fly in airplanes" are synonymous terms. A bill can easily be attacked in a legislature by an antagonist who is clever enough to show that only a very small percentage of the people of his state fly in airplanes and that therefore the bill is not benefitting "the public" when it provides for the use of public monies to improve a flying field. However, proponents of such a bill can often point to the ruling of the State's Attorney who may have decided that a municipality of the state had the right to spend its public funds in the acquisition of an airport because such an airport was of public benefit. Eventually such laws will be passed in all states. Or existing laws which are applied to public utilities will be worded or interpreted to include airports.

(*Continued on page* 70)

This Georgia airport is a good example of a modern field that is comparatively obstruction-free. Note the clear, level approaches on practically every side.

The Air-Minded Philippines



Philippine aviation got a great boost with the opening of Clipper service.

by LYNN C. THOMAS

THE development of commercial air transportation in the Far East has long ago passed through its infancy stage and is now in an advanced stage that is comparable with that of the United States.

At the present time there are, operating in the Philippine Islands, four commercial airlines and two flying schools. Three of these airlines maintain regular scheduled flights and the fourth operates on a non-schedule basis.

The remarkable degree of safety that has been attained by these lines in their operations is a glowing tribute to the management and personnel. They have operated with a high degree of efficiency and reliability that even in the United States would be worthy of commendation.

What is probably the most famous airline in the world today, is bringing its giant planes in and out of Manila with clockwork precision. Pan American Airways, flying their big Clipper ships out of San Francisco to the Orient, has inaugurated the most extensive airline of its type in the world. These planes run on a six-day schedule, making it possible for residents and visitors of the Philippines to not only receive fast mail service, but also to travel back and forth between Manila and the United States with perfect ease and safety.

During the last few months, the personnel of Pan American Airways have been very busy developing a new base for the Clippers at Cavite, situated across the bay from Manila. This bay, facing the beautifully situated Canacao Bay, is surrounded on three sides by water.

The passenger station at Cavite is of strictly native construction throughout. The native nepa and sewali woods were used not only for the buildings, but also for the very distinctive furniture that is in use in the palatial Manila district traffic office.

Map courtesy of "Jane's All the World's Aircraft".

★★★★★★★★★★★★★

To many, Manila is just a Pan American stop in the Pacific. But the Philippine Islands are far from backward in aviation.

★★★★★★★★★★★★★

While flying regular schedules, the Clippers are in port here in Manila for forty-eight hours, during which time they are completely serviced. The extensive facilities accorded here at this base make it possible to completely overhaul the plane without undue loss of time or trouble.

They also have a very fine weather bureau in Manila that co-operates with the airways in every way possible. A large scale blackboard map of the Philippine archipelago with numbered weather stations has been completed in the airport building for sketching in the weather quickly when planes are approaching the Philippines.

The system's ninth big four-engined Sikorsky took up its transport duties last March on the Manila-Hongkong run. This is the ship that made that remarkable flight from San Francisco to Auckland, New Zealand, on the 17th of last March. At that time it was named the *Pan American Clipper,* but upon taking over its new duties the name was changed to the *Hongkong Clipper,* which it will continue to bear. Since the advent of the four-engined type of Clipper, Pan American has logged more than five million miles of over-ocean flying. This represents the combined routes of the San Francisco and Manila route, Manila-Hongkong, and over the South American and Central American routes.

With the inception of the trans-Atlantic routes, this figure will soon be raised to a staggering total. Due to the experience gained in this flying, the personnel of Pan American Airways has gained a knowledge that is unequaled anywhere in the aviation industry. With this experience, Pan American will continue to forge forward, and to conquer more new and hitherto seemingly im-

possible routes than has ever before been deemed possible.

In February, 1931, a group of prominent business men of the Philippine Islands formed the Philippine Aerial Taxi Company. Within a short time they had established a regular scheduled run out of Manila for Baguio and Paracale. Up to the time that this company was formed, the number of people in the Philippines that had ridden in airplanes could be counted with ease. The company has now carried thousands of passengers and has set a record of safety and performance that seems incredible considering the difficulties encountered in their operations.

During their service the planes of PATCO, as the company is called in the Islands, has had to fly through typhoons, floods and fogs that would have grounded the average plane, yet despite this they have completed 97.8 per cent of their scheduled flights. This is indeed a record to be proud of in view of the fact that there has not been a single injury to any passenger, or to any of the personnel of the line.

It is hard to realize now, the conditions under which the company worked in the beginning. Aside from those in use by the United States Army, there wasn't a decent landing field in the Philippine archipelago. The company mounted pontoons on its first planes and flew from what is known as Pasay Beach, just south of the city of Manila. They also used this beach as a landing field for the one small training ship.

There was a world of difference in the planes they used then and the ones that they use now. There was a little two-place Waco, an early Stinson and a tiny Aeromarine Klemm used as the training ship.

With that equipment, however, the company started in with sight-seeing flights, chartered trips, and instruction flying. Rates were low, right from the start and still are. There was no get-rich-quick idea in this company. It was primarily doing a job of pioneering aviation in the Far East.

In June of 1931, the company leased some ground located at Grace Park, and began construction of what is now the Grace Park Airport. Soon after the field was completed the company added another plane to their fleet in order to handle the increasing business that was coming their way. In February, 1932, the company opened another landing field at Loakan, and in Baguio, and began making its trips direct whenever weather permitted. The Wacos were used on this run into the mountains, while the Stinson cabin job did the sea-level operations.

But it became apparent that the company would soon be needing better planes. They immediately set about securing these. In March, 1933, a new Bellanca *Skyrocket*, five-passenger cabin ship, powered with a Pratt and Whitney *Wasp* motor that developed 450 horsepower, arrived in Manila and was put into immediate service.

With the arrival of the new plane business jumped almost overnight and within three months' time this plane had carried 958 passengers between Manila and Baguio. For the first time it was realized that the airplane had entered the Phillippines as a reliable, regular, and necessary mode of transportation.

Shortly after this, the company entered into a mail contract with the Philippine government and began carrying the mail into the various ports. In the late fall of the same year PATCO, purchased another Bellanca to help keep up the heavy schedules that they were running.

On September 19, 1934, the company completed its first year of uninterrupted 100 percent service on the Manila-Baguio run. In that year they had carried 2,982 passengers, and no scheduled flight had been missed. It took the terrific typhoon of October 1934 to break PATCO'S uninterrupted record. For one day all ships of the fleet were grounded, but took to the air again as soon as the storm let up.

As time went on, it became necessary to add several more ships to handle the increased business and also to open another run into the southern Philippines. With these new planes, the hangar facilities and work shops were enlarged to service the fleet of busy planes. Naturally, with the expansion of the company, the personnel had to also be enlarged.

This work all went on under the direct supervision of W. R. Bradford, who was chief pilot as well as general manager of the company. He was responsible for building up the efficient staff of pilots and ground personnel that were to see that the planes got through on the schedules set for them.

Much is to be said for the accomplishments of this line in giving the people of the Philippines the reliable and efficient service that has characterized their flying from the time that they first started their line. With the present plans for expansion it is believed that this service shall continue to give the people of the Philippines the excellent service that has characterized it in the past.

Four years ago, the Iloilo-Negros Air Express Company was organized to conduct a passenger, mail and express service to the islands of the southern Philippines. The present operations of this up and coming young company included two round trips during the week from Manila to Davao, touching Iloilo, Cebu and Del Monte; three round trips between Manila and Iloilo per week; three round trips between Iloilo and Bacolod per day; and one round trip between Iloilo and La Carlota per day. The company also runs a special charter service, making it possible to charter planes for trips anywhere in the Philippine archipelago.

During its existence, this company has set up a perfect safety record and by this have succeeded in gaining the con-

(*Concluded on page 74*)

National Air Board Award

POPULAR AVIATION, through its National Air Board, announces the establishment of a $250 award that will go to the individual or organization that has developed a device or method during either 1936 or 1937 that, in the opinion of the Air Board, has contributed the most to aviation safety. *This award will not be made for a record of safety.*

In determining who is to receive this award (which will include a commemorative plaque or medal in addition to the $250), POPULAR AVIATION encourages the cooperation and participation of all its readers. Readers are urged to give serious thought to the achievements of aviation personages or organizations during 1936 or 1937.

In discussing the advisability of this award, members of the National Air Board agreed unanimously that such an award is sure to stimulate persons and organizations toward the increasing of safety in flying. This magazine will be more than amply repaid if this inducement achieves the expected results. Here, then, are the award rules:

The device or method may be of any character whatsoever provided it contributes to aviation safety.

The following are merely illustrative examples of the type of developments which would receive considerations:

New automatic pilot.
Landing gear to prevent nose-overs.
System for blind landings.
Lift increase device.
New aid to navigation.
Device to prevent collisions in the air.
Fire prevention method.
Parachute for passenger use.
New method of training for instrument flying.

The award may be made either to individuals or to an organization, but if made to an organization then the actual responsible individuals in the organization should be given credit.

These devices or methods will be carefully considered and voted upon by the Air Board.

Such devices or methods may be submitted either by those responsible for their development or by others not so responsible.

No form of application is available. It is merely necessary to send in a statement setting forth in concise but adequate form—

1. A description of the device or method.
2. The contribution made to aviation safety.
3. Any substantiating information.
4. Names and addresses of individuals or organizations.

The cooperation of readers of POPULAR AVIATION is invited.

All correspondence should be addressed to the National Air Board, care POPULAR AVIATION, 608 So. Dearborn Street, Chicago, Illinois.

END

The Zeppelin Is Coming Back

by VILAS J. BOYLE

The Hindenburg may be down, but dirigibles are not out. LZ-130, newest and greatest airship, soon will fly.

THE Salvation Army says a man may be down but he's never out. Paraphrasing this time honored slogan it might be said that Zeppelins may be down, but their persistent operators are never out.

Despite the dreadful tragedy that befell the dirigible *Hindenburg* at Lakehurst, N. J., last May—when it crashed in flames, a total loss, with a toll of 36 lives—Zeppelins will shortly ride the sky lanes again. Sometime early in the spring of 1938, the newest and most modern of all Zeppelin airliners (the yet unnamed and uncompleted LZ-130) will poke its silver nose over New York's spires on its first flight in regular mail, passenger and freight service.

And the gas bags of the new ship will be filled with safe, American-manufactured helium instead of the deadly and highly inflammable hydrogen which caused the destruction of the *Hindenburg*. On the closing day of its recent session, Congress voted to ease the restrictions which had kept helium an American monopoly, and to permit the sale of it to the operators of commercial airships here and abroad. In modifying the protective Helium Act of 1925, Congress, however, took precautions to prevent the helium from escaping from this country in such quantities that it might be used against the United States in warfare.

Dr. Hugo Eckener, grand old man of the Zeppelin service and acknowledged as the outstanding world authority on lighter-than-air navigation, hopes to be at the controls of the new airship when it makes its first flight to American shores. Captain Max Pruss, horribly burned in the *Hindenburg* crash, also hopes to be in the control car.

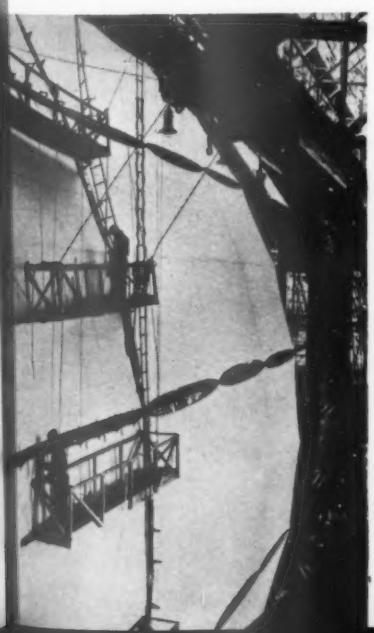
The faith of these Zeppelin veterans is equalled, according to present indications, by the travelling public. Dispatches reveal that, with the LZ-130 still uncompleted, applications for accommodations have been received in large numbers from both sides of the Atlantic. The long and technical discussions which marked the investigation of the *Hindenburg* disaster by the United States Department of Commerce impressed the air-minded public with the safety of airship operation with non-inflammable helium gas. The ability of the Germans to build and operate airships with marked success has never been seriously questioned despite the tragedy that befell the *Hindenburg*.

In addition to the safe helium, the new airship and the *Graf Zeppelin*, which was grounded after the *Hindenburg*, crash to await the time when helium became available to it, will have a new system of trans-Atlantic weather reporting ships at their disposal. These weather ships,

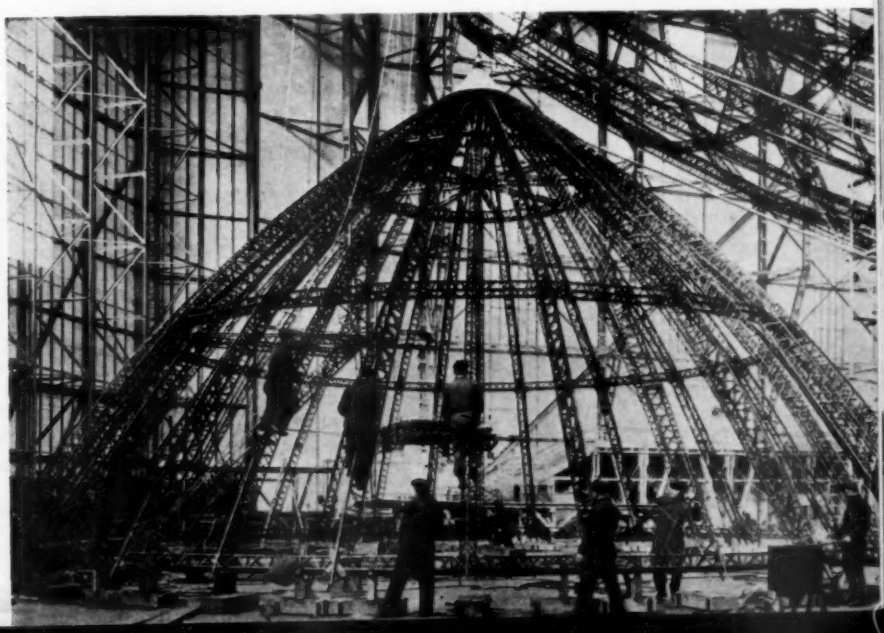
(*Concluded on page* 75)

Gallant old Dr. Eckener (top) soon will stand at the helm of LZ-130 on her first flights. Above are her main former rings when building started.

With the job of covering (below) well under way, LZ-130 soon will be flying.



Below is LZ-130's metal nose framework. Sections are built separately.



FOR SALE
—To Uncle Sam

Grumman's latest fighter, the XF4F-2.

Because American military aviation men are the most demanding buyers, fine ships like these must be developed.

RARELY—if ever—is there a letdown in the development of new ideas for the aviation branches of the U. S. Army and Navy. This is a fact largely because Uncle Sam is probably the best customer several large American aircraft manufacturers have. Not only is he just a good customer; he pays well and is constantly on the lookout for something a little better than the near-perfect article he already has.

The three airplanes on this and the opposite page are the three latest developments in that constant drive for warplane superiority. They are products of three companies that, for several years at least, have subsisted almost entirely on the never-empty pocketbook of Uncle Sam.

The ship at the top of this page is Grumman's first attempt to produce a military monoplane. Exclusively "Navy", Grumman's XF4F-2 is intended for a shipboard fighter for operation on aircraft carriers. The landing hook has been secreted in the tail tip of the ship's fuselage, directly below the rudder. With the exception of its single mid-wing, the XF4F-2 closely follows the lines of the standard F3F-3 Navy fighter now in use. Incidentally, compare the picture at the top of this page with the three-view drawing on page 30 of the November, 1937, issue of POPULAR AVIATION.

Like all new American military aircraft, everything about the Curtiss XP-37 (below) is secret except that one photograph. Basically, this ship is the standard Army P-36 now being built in numbers for the Air Corps, but with a liquid-cooled 1,000 h.p. Allison engine (same powerplant as the Bell *Airacuda*) in place of the air-cooled Wright engine. Though nothing is known about the XP-37's performance, there is little danger in judging that this ship is probably the fastest single-place fighter in the air today.

Consolidated Aircraft's latest addition to Naval aviation is that company's first four-engined airplane, the XPB2Y-1 on the opposite page. Literally, this airplane (like Sikorsky's new XPBS-1) is a flying battleship. Its range is almost phenomenal. Armament and bomb load "is more than sufficient."

This latest Curtiss Army fighter now is at Wright Field undergoing tests. None but the most skillful airmen can handle a ship with the performance of the XP-37.

UNCLE SAM'S WINGED MAN O' WAR

Yankee Naval airmen now are testing their newest warplane, the Consolidated XPB2Y-1.

Frank Caldwell, airline dispatcher at Chicago, holds a duck he saw make a forced landing on an airport runway. United Air Lines press agents conveniently posed him, the duck and Stewardess Florence Pond before United's blatant insignia.

Kappa Sigma fraternity recently named Cyrus R. Smith, American Airlines president, its "Man of the Year" for his company's "outstanding job in air transportation during 1937". Left to right are Karl Frederick, Beauford Jester, Smith and Allen G. Ritter at the presentation. All are full-fledged Kappa Sigs.

Personalities

A notorious publicity-hater, Orville Wright finally posed for a photographer after the latter had waited six hours. Occasion was the 34th anniversary of the Wrights' first flight.

Here is one-year-old Karin Kestler, first baby to fly the Pacific aboard a Pan American Clipper. She is shown with her mother, Mrs. Nancy Kestler of the Philippine Islands, with whom she made the trip.

Here's airline passenger-service with a flourish! Mama was elsewhere in the South America-bound Clipper when tiny Dolores Hernandes got hungry. But Pan American pursers are versatile.

If Senators Pat McCarran (Nevada, left) and Edwin C. Johnson (Colorado, right) win the battle they have on hand, all American airlines will go under Interstate Commerce Commission regulation.

Seriously injured in an airline accident in which her husband was killed some time ago, Mrs. Martin Johnson is well on the road to recovery. She still has great faith in air transportation, travels airlines regularly.

Because it turned in the safest Naval aviation record for 1937, Patrol Squadron Seven (Consolidated boats) was awarded the annual Schiff Trophy recently. Lieut.-Comm. Robert Fuller, VP-7 commander, gets the award from the President.

This charming young lady unofficially broke the Detroit-New York speed record by flying her Barkley-Grow transport there in 2 hours and 20 minutes. She is the wealthy Jayne S. Topping.

POPULAR AVIATION scoops the world with this candid camera shot! Our lurking photographer sneaked up on this "Cub" to find none other than Swanee Taylor climbing in for a brief sojourn in the clouds.

By D. W. W.*

JUST as we predicted here two months ago the ding-dong battle in which Pan American Airways is engaged in Washington has come out into the open. . . . The first public blast came from the American Export Steamship lines in charges that Pan Am is a monopoly. . . . The Export group wants to get a cut at flying the Atlantic ocean but they haven't got a pilot or an airplane.

Behind the scenes there is even more of a lively turmoil. . . . Grover Loening, who made a name for himself in the '20s as a designer (Loening Air Yacht and Loening amphibians) is most active in the battle and ready to wage real war. . . . He used to be a director of Pan American Airways but quit some time ago . . .

Since then Grover has been busy on the other side of the fence. . . . He is known to be active in the American Export company's aviation plans. . . . In addition, he has successfully (so far) lined up powerful support on his side, including a Bureau of Air Commerce official and the Maritime Commission.

* * *

The big laugh of the 1937 fall season was on a lot of Wall street bankers, a Chicago merchant prince and a Chicago publisher who purchased the latest Grumman output, the G-21 eight place amphibian. . . . Although the airplane is supposed to carry a big load and be a hot ship they found the payload with full tanks, pilot and co-pilot was only 74 pounds. . . . In other words, if the co-pilot went the ship could carry no passengers and even the owners couldn't ride. . . . The harried Department of Commerce placated these pillars of society by adding another 500 pounds to the licensed payload.

* * *

Poor Rudy Kling who crashed at the Miami air races was expecting his death in a race accident. . . . His wife told friends after the tragedy that Rudy had said to her: "I think conditions for this race are terrible but I'd better go ahead. I may not get back." . . . Then he gave her complete directions for disposal of his belongings, for handling their finances. . . . He also told her just how he wanted his funeral conducted. . . . What flowers he wanted. . . . Where he wanted to be buried. . . . And his last direction to her was to keep her chin up.

* * *

A report from England is that the Royal Air Force is to make a try during 1938 for two world records. . . . One will be for the distance record now claimed by our friends the Russians, and the other will be for the world landplane speed record held by Germany at 379 m.p.h. . . . The distance record is to be flown in a Vickers *Wellesley* which is of the geodetic type construction. The engine will be a Bristol Pegasus of 860 h.p. . . . The speed attempt will be made in the new British fighter the Supermarine *Spitfire*, Rolls Royce V-12 engine rated at 1,050 h.p. . . . The *Wellesley* is supposed to have tanks for 8,000 miles non-stop. The Russian mark is 6,500 miles. . . . The *Spitfire* with a special engine might do 390, the British say.

* * *

Executives of commercial airlines of the United States who have cursed every act of President Roosevelt ever since he cancelled their mail contracts in 1934, are holding their breaths and listening for his least word. . . . They can't continue to operate unless he gives them more air mail pay.

About two weeks ago the President practically gave the boys heart failure when he informed them he would not allow the Lea-McCarran bill to pass Congress. . . . The airline folks think this bill would cure their ills and had been working two years to get it passed. . . . Just when most of them were about to shoot themselves, the President let them know he *would* pass a *Roosevelt* bill which would do everything proposed in the Lea-McCarran bill.

The difference would be that he could claim to be aviation's savior. . . . And Senator Pat McCarran who has worked hard for aviation but who, though a Democrat, voted against the court packing scheme, will be pushed into the background. . . . Right now the executives are pussyfooting Washington corridors hoping the man in the White House will keep his word.

* * *

The Army Air Corp's latest hush-hush matters are the 2,000 h.p. liquid cooled Allison engine at Indianapolis and a new heat-ray detecting machine which can locate approaching airplanes through fog, smoke, gas, or what have you. . . . The new Allison is just twice as powerful as the engine the army installed in the Bell *Airacuda* and in the new Curtiss P-37 fighter. . . . Allison executives can't even talk about the motor.

The heat-ray detecting apparatus is supposed to be so secret that even to mention it means courtmartial by the gents who are experimenting. . . . It works at great distances; airplanes are supposed to be picked up by it as far as 20 miles away. . . . It can also be used for signaling and to keep airplanes from bumping mountains, steamers from bumping rocks and other steamers. . . . Quite a gadget if it works out.

* * *

Speaking of engines—the army air corps new Curtiss A-18 twin-engined attack planes which came out with Wright *Cyclones* are now to be fitted with Pratt & Whitney *Twin Hornets* of 1,400 h.p. . . . The English have a new engine—the Alvis—an 18-cylinder twin row radial rated at 1,700 h.p. . . . Pratt & Whitney is conducting a lot of secret experiments with a sleeve-valve engine.

The sleeve valve has been well developed by the English Bristol company. . . . It eliminates the poppet type valve, reduces the number of small valve parts which often give trouble, enables designers to increase compression ratios and provides for more perfect exhaustion of burned gases and consequently increases fuel efficiency. . . . P & W may have a high horse power engine of this type out within a year.

Al Menasco is about to get an ATC on a new four cylinder in-line air-cooled 50 h.p. engine. . . . He wants to get into the field Continental and Aeronca motors have dominated so long. . . . The Church, who once built little 30 h.p. engines and the Church mid-wing racers, has virtually completed the development of a 100 h.p. air-cooled Ford engine for airplanes. . . . It weighs 200 pounds less than the liquid-cooled editions of the Ford V-8 as adopted for airplanes, and develops about 15 more h.p.

* * *

Don A. Luscombe (Luscombe *Phantom*) of West Trenton, N. J., is supposed to have closed a deal with several top executives of the Aluminum Corporation of America for large scale financing. . . . With the money he's to go into real production with three all-metal airplanes. . . . One will be the *Phantom*, improved 1938 version with the 145 h.p. *Super-Scarab*, the second will be a lighter ship with a 90 h.p. Lambert, and the third the $1,500 job with a 50 h.p. engine—Continental, Menasco, or what have you—that is supposed to cruise over 100 m.p.h.

Luscombe can really do the job. . . . He's set up to go into real production. . . . He might even be the Henry Ford of Aviation we've all been looking for so long. . . . He expects to use the same presses and stamping machines for the fuselages of all three airplanes. . . . He gets around stress and weight differences by using different grades of metal sheeting, depending upon the weight and h.p. of the ship to be made.

* * *

Stewardess note: All the big airlines are withdrawing their objections to the stewardesses being married and continuing their work. . . . Apparently the theory now that the sleeper planes are in service, is: "The girls soon will find out about life while at work. Why not let them be married?"

* * *

The Navy department has just issued an order preventing any civilians from

(*Concluded on page* 95)

*The author is one of the best-informed aviation men in the country, withholding his identity in order to maintain complete freedom of comment. —The Editors.

The Airport Clan » »

by WILLIAM B. RYAN

Step right out to your local airport, folks, for an eye-witness demonstration of this old and more or less honorable community.

Old Timer

MANY years ago a writer named Charles Lamb divided all men into two categories — "those who borrow and those who lend." At the time this was considered rather cute, as it had never been done before. But today, in spite of the fact that the novelty has worn off, certain unimaginative oafs continue using his slipshod methods of classification, with the result that the whole world is more or less puzzled about the whole world—a situation which one authority has called "a shocking state of affairs."

Especially in the aeronautical world are people hazily defined and categorized. As an ardent follower of our little sport, I intend to make a thorough explanation of several important aviation entities and their nature. It is earnestly hoped that all true aeronauts will help me in this great work, as my data is far from being complete. If they do, they will amaze their friends, who have long been blind to the real truth about aviation and its people.

Shoddy phraseology like "he spun into a loop" certainly needs correcting, like other glaring newspaper errors. But I do not believe in the obvious, and a campaign against such errata would certainly rank me with those who seek to insure the eternal spelling of "obbligato" with two "B's". Let the lexicographers take care of the drudgery. My cohorts and I will attack the more subtle errors!

The newspapers, for example, are always referring to "airport attaches." Now who ever heard of such a thing? There aren't any attaches on airports. Of course not!

They are airport people.

Attaches, indeed! Hmmph.

I have compiled a basic list of these airport people which I intend to send around to all the newspapers, so that they will be sure not to make this mistake again. To make matters easier, I am classifying them in the order of their appearance. I mean, if you arrive at a totally strange airport, and don't let anyone know that you flew the *Graf Zeppelin* to Bemidji, Minn., non-stop, all these people will cross your path. They are really very interesting, and you will meet them, one after another, in the order given below. A study of their ways is highly recommended as an elective to replace descriptive geometry in aeronautical engineering schools.

Dumb Student

Airport Person No. 1. The Old Timer.

An old timer is an airport person who flew "Mollies" during the war 1914-18. He does not fly them now. But he could if he wanted to. Airport people who flew "Jennies" during the war 1914-18 are not classified with old timers. They are sensitive about the whole thing. The first person who will talk to you on a strange airport will be an old timer. He is usually a hide inspector on his day off. When he is not inspecting hides, or talking to you, he is busy explaining how things worked in the old days to other airport people. Old timers are highly esteemed by airport people for this reason. Insurance statistics show that within a few years, maybe 20, all old timers will have been hit by trains, run over by cars, starved to death by their wives, eaten alive by ants or otherwise done away with. For this reason, airport people like to read insurance statistics while eating breakfast. Some old timers have beards, but it really doesn't matter. Old timers have no control over strikes, national disasters or acts of God. This makes them something like the invoice that comes with a can of pigmented dope.

The Railbird

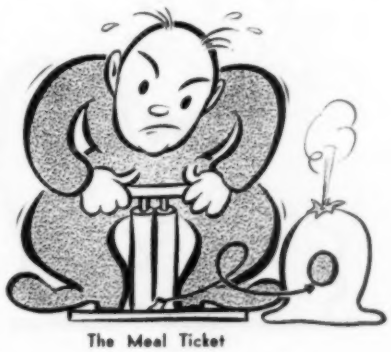
Airport Person No. 2. The Railbird.

Railbirds are airport people who toil about as much as daisies do. They spin, though, but with the duals out. Railbirds spend most of their time being railbirds and drinking coffee, and can be found on any recognized airport or flying field by looking behind the nearest "Keep Out" sign. There is little chance of finding more than one of two railbirds behind such a sign unless it says *"Positively* No Admittance," in which case four or five, or maybe a dozen, can be rounded up with no trouble at all. Railbirds sometimes make ten per cent by horning in on airplane deals. The airplane deal is said to have been invented by Rube Goldberg. Airplane deals help keep the number of ships sold way down, and are a boon to the man in the traffic control tower. They also help keep the airlanes safe for the airlines. The operations manager of the airline from Pottsville, Mo., to William Williams' Corner, O., is said to be in favor of this. He is a railbird at heart, and used to be one. But one day he was caught coming out of a *philharmonic concert!* That was the end, and he had to go to work. He told his captors that he had just gone in to use the phone, but it didn't do any good. Mostly, railbirds keep their records clean of all such backsliding. The things they talk about are interesting, too, but Uncle Sam says "No."

The Fish

Airport Person No. 3. The Dumb Student.

Dumb students are airport people who buy what the rest of the airport people sell. For this reason they are viewed with alarm by most airport people. They have no future, most of them. Others have money and by applying themselves can become "Fish" or "Meal Tickets." People who will be discussed later are always trying to get the dumb students out of the way. Dumb students do not know this. The easiest way to do it is to let your equipment run down, and unless this is done, there is practically no way of keeping dumb students from coming around and buying things. They



The Meal Ticket

are very hardy. Airport people will not allow them in their hangars or behind the "Keep Out" signs where the railbirds go. This is not to keep them from hearing the railbirds' stories. It's just pure meanness. Sometimes dumb students buy airplanes, or just remain dumb students. They lead a cloistered life, and think that the other airport people are wonderful. Sometimes one airport person decides that he doesn't like another airport person. When this happens, he gets all the dumb students he can find and they, united in a common cause, are called a "side." The other airport person has a side, too. The duties of a dumb student when serving as a member of a side is to lie about the other side. Isn't that a shame?

Airport Person No. 4. The Meal Ticket.

A meal ticket is a dumb student with a lot of money who goes into the aviation business. Meal tickets are always right. They like airport people for a while, but soon become discouraged. Meal tickets hire airport people and work for them. That is odd, isn't it? The airport person sits in the office and reads POPULAR AVIATION while the meal ticket pumps up tires, checks valves, cleans carbon and pays the rent. The meal ticket sometimes wants to fly the airplane, after which there is a fight. But he always wins, because he is always right. Sometimes the airport person doesn't like this. Meal tickets eventually get to know the good lawyers from the bad ones.

Airport Person No. 5. The Fish.

Fish are airport people who are practically the same as meal tickets only they don't have as much money.

Airport Person No. 6. The Operator.

You will almost give up hope of ever meeting a real operator. He is an airport person who sells things like flying time, or airplanes, or gasoline, or rents hangar space. If you try hard, you may be able to meet an operator after a couple of days of effort, unless you are flying a visiting ship and want to buy gas. When

(Concluded on page 86)

The Operator

"Clear and Unlimited"

By SWANEE TAYLOR

George Seay Wheat . . .

Rare it is that a man can, both in living and in dying, exemplify Life's immutability to his growing boys. But if ever a man dwelt gracefully a while on this earth, only to fall before a premature sickle, that man was George S. Wheat, able vice-president and director of United Aircraft Corporation. During his crowded life he demonstrated the fine art of living to his sons; and in dying he vivified to three chips off a very sturdy block the great impermanence of all man's handiwork. He was but 51 years old and death struck with bullet swiftness.

Ever a dynamic worker, George Wheat bounced back from an appendectomy after being away from his desk a short twenty days—this against his friends' urgent pleas to take it easy. But his company needed him, so he wouldn't stay down; lamentably he postponed a long anticipated vacation in the South.

Christmas Day was happy, serene and full of promise. During the early part of the day, prior to sitting down to a whopping Christmas dinner, he wandered with his boys along the woody ridge back of Dingley Dell Farm, outside Darien, Connecticut. Life that day was indeed full to the overflowing for the Wheat family. The memory of it should forever sustain George Jr., Jack, little Dale and their mother and bring to them calm in the troubled hours ahead. I am sure that George will, through his eternal sleep, keep dreams of that last day on earth: Of his happy family solidarity; his beautiful home safe and secure; of the woods with its moist smell of good earth seasoned by the tang of salt-water brought on the South wind from Long Island Sound; of the day-long enjoyment of that celestial music only a father hears when his son speaks. When better to die than after just such a day!

We who knew him in aviation circles are loaded, too, with splendid memories of the man. George Wheat belonged to what may be called the third dynasty of aeronautics—the people who came in to pick up a rather tattered banner after the early pioneers and the War Birds had carried it as far as they could. And lucky for our Cause that George Wheat threw in the weight of his personality and his boundless wit and energy. His great sagacity and tireless efforts will prove inestimable when the final day of accounting arrives. Yet, for all his tenacity and pluck he wasn't a harsh man. Quite the contrary, his geniality, good humor and high thoughtfulness were the outstanding traits of his grand character. So much so, that George Wheat was "best friend" to more men than anyone I've ever known.

On the morning after Christmas he complained of a queer feeling in his shoulder and left side of his face. The numbness developed and spread so quickly that in a matter of minutes he was beyond mortal help. But the end came (inescapable in coronary thrombosis) there at home, in the blessed bosom of his family. And two days later, as a few prayers were being said, the family airedale padded stiffly in the drizzle outside utterly unconsoled by the fact that aviation's elite were mourning at the master's bier.

Yes, the elite of the aeronautical world, almost to a man, were present to pay friendship's last token. The Wheat boys can well be proud of having had such a father; seldom does any son see his dad so unanimously revered and honored. And if George Wheat's lifelong prayer is to be answered his boys will keep their eyes ever fast on the truest lodestars in Humanity's firmament: those bright stars, Thoughtfulness, Generosity and Good Humor. For, his own life's voyage was made smoother than most men's because he set his course to the clear blue light of that very constellation all of his days.

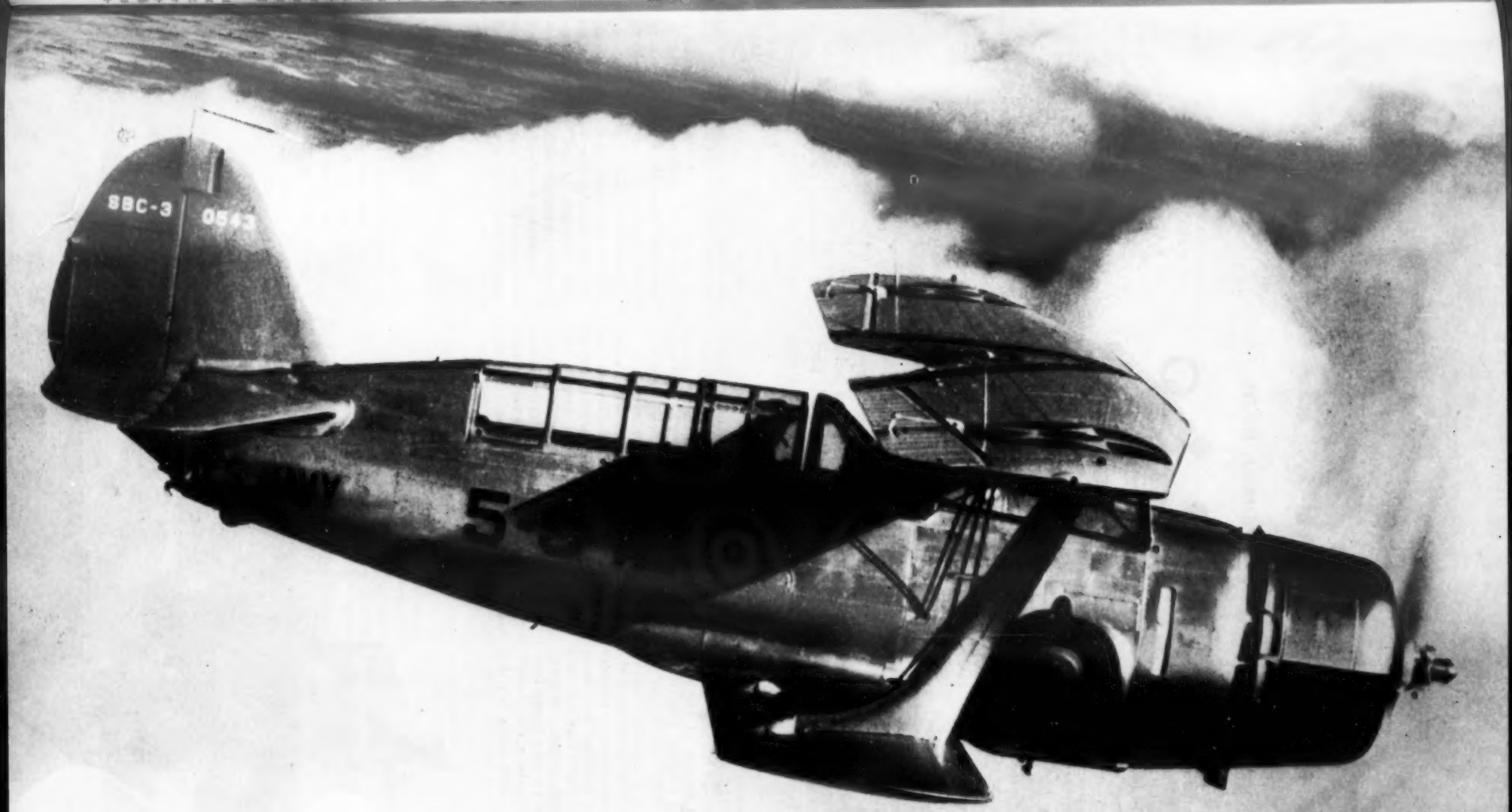
Join me, if you will, in saying of George Wheat: May God rest his sweet valiant soul!

145th Air Anniversary . . .

It is not generally known that General George Washington was not only the Father of our country but he was the Father of Air Mail, as well as Father of American Aeronautics. Too, the very first flying license issued anywhere was written by George Washington. No one in our national history ever spoke with more prophetic vision, of the future and potential benefits of man-flight, than did General Washington. So great was the first president's interest in the subject that he invited the then outstanding French balloonist, Jean Pierre Blanchard, to come to America to "... demonstrate his Art." With the result that the first recorded flight in the Western World, as shown by the woodcut at the bottom of this column, took place in Philadelphia right across Walnut St., from Independence Hall. Furthermore, just before the balloon went up President Washington handed the pilot the first written message ever to be transported through the air by a human being.

What, you ask, is this stuff about George Washington issuing the first pilot license? Well, here is how it came about: Our own Benj. Franklin, then Ambassador to France, wrote his President glowing reports about balloon flights which were growing more and more numerous in Europe at that time. President Wash-

(Concluded on page 76)



SKY RAIDER

The Navy's new Curtiss SBC-3

America's Flying

by NORMAN FOSTER

ABOUT 2,000 feet beneath us an endless pattern of whitecaps lapped silently away on the crest of a turquoise sea that stretched to the distant horizon. On high above an occasional wisp of cirrus clouds dotted the royal blue sky. At the controls of a twin-engined Douglas *Dolphin* amphibian sat a weather-beaten man, whose face was Indian red from the winds of a decade that he had faced as skipper of a U. S. Coast Guard cutter.

Three years ago our pilot was selected from a group of high-ranking Coast Guardsmen to enter the aviation branch of the service. He had gone through the regular Naval training mill at Pensacola, Fla., and had graduated from the training school with the coveted A.P. (airplane pilot) rating. About 40 miles behind us was the modern, well-equipped Coast Guard aviation base at Salem, Massachusetts, long famous for its part in early American history.

Our flight was merely a routine one to this old salt of the sea and his four enlisted men, members of the plane crew. But to me, one who was watching how our Coast Guard works now that there are no prohibition laws to be sanctified, this was to be one of the most thrilling flights of a lifetime. Practically every morning a regular patrol sets out from Salem harbor to make a routine study of seaboard conditions along the coast. In the winter-time the Douglas *Dolphin* might be pointing her blunt nose northward to chart icebergs that might hamper trans-Atlantic shipping from Boston, New York or other shipping terminals along the coast.

But this was a calm summer's day

No job is so trying, no flight is so dangerous that a clear-eyed Coast Guard airman will not tackle it. Here is but a small part of that service's brilliant story.

★

and the patrol of the moment was to take us across the charted waters of Massachusetts Bay, skimming across the sand dunes of Cape Cod and then out to open sea for a quick glimpse at sea-going activities of the day.

Inside the cabin activity was varied, for the beginning of the day's work was still an hour or more away. One of the crew members was making a few adjustments on a large aerial camera. The radio operator's wrist shimmied on his telegraph key—the plane was in constant touch with its home base and also divisional headquarters in the Custom House at Boston.

In a few minutes the skipper called me up to the pilots' cockpit, where he sat, wheel in hand and feet on rudders. His compass course was southeast and the *Wasp* engines were each purring at 1,850 r.p.m. The skipper revealed some of the plans for the flight. A few small boats had been reported as participating in a bit of illicit rum-running, landing their cargo of liquor on isolated, sandy shores of Cape Cod.

I questioned the skipper: "Do you mean that we'll land and take over any vessels today?"

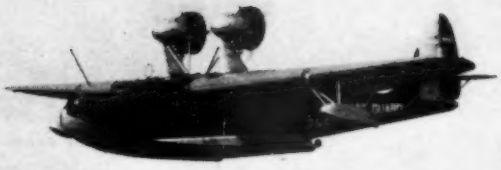
"Well, not exactly. You see, the airplane can function much faster than the cutters. It's our job to spot anybody who might be afoul of Federal regulations. If we pick them up within 15 miles of shores we can chase them for any given distance until one of the cutters overtakes them."

Then he went on to explain the code of "constant pursuit." As long as any pursued vessel remains within sight of the plane, she can be taken over by surface vessels of the Coast Guard. Back in the rear of the plane, a member of the crew was making a few final adjustments on the aerial camera—that Coast Guard records pictorially the characteristics of all pursued ships.

After a bit more than an hour of flying, our *Dolphin* crossed Cape Cod and was speeding down the coastline—southward bound. Suddenly a small vessel, traveling perilously close to shore, was sighted. The skipper lowered the nose of the *Dolphin* and came abreast

A badly burned seaman is lowered over the side of the Samuel Q. Brown, placed aboard the Coast Guard ship, then is flown to immediate first aid

Sentinels



The three Coast Guard flying boats saluting the Coast Guard cutter "Pandora" off Florida are the "Acanar", "Sirius" and "Arcturus". These twin-engined planes are based at Miami.

of the vessel. Cruising at about 125 m.p.h., the plane whirred past the boat and the skipper shouted to his boatswain's mate, "Did you get her name?"

The boatswain's mate had caught the ship's name, reading the lettering on the stern as the skipper had circled. He lowered his binoculars and shouted the name of the boat to the skipper, who acknowledged it with a curt "O.K." The radio operator swung into action and queried Divisional Headquarters at Boston, asking identification of this vessel.

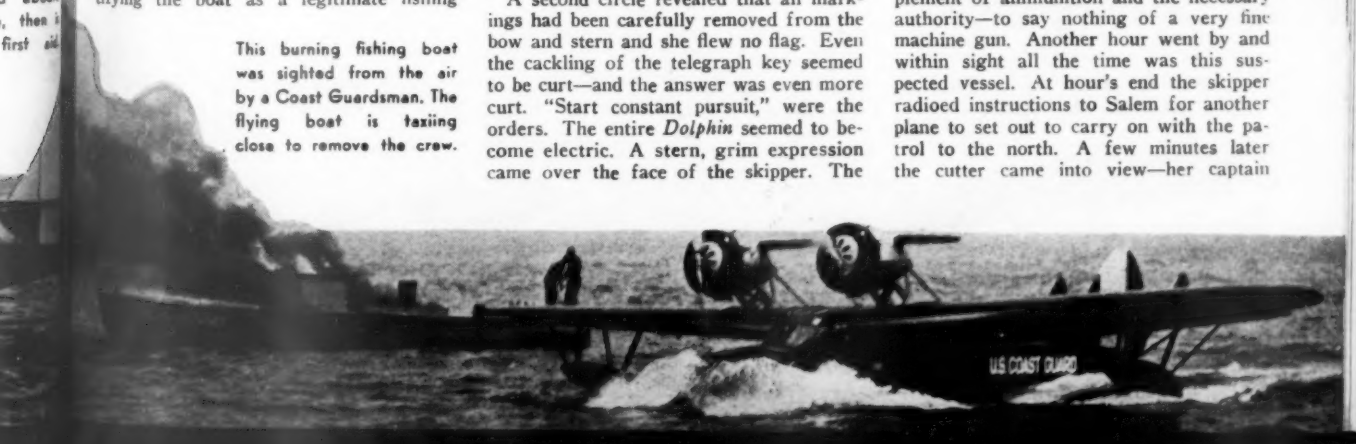
By the time the *Dolphin* swung about for a second pass at this ship, the radio operator passed forward a message, identifying the boat as a legitimate fishing vessel. The crew on board waved heartily as the *Dolphin* sped overhead and the Guardsmen returned the salute. This was no violator.

But further down the shore was a ship, whose business was not quite as legitimate. We were flying at about 100 feet off the water now. The *Wasp* motors were roaring now—for the skipper had spied a smaller vessel, getting under full steam and pulling hurriedly away from the shore. On her deck a few men could be seen as we approached her. However, by the time the Douglas swooped over the forward deck, all hatches had been hurriedly closed and not a soul was seen.

A second circle revealed that all markings had been carefully removed from the bow and stern and she flew no flag. Even the cackling of the telegraph key seemed to be curt—and the answer was even more curt. "Start constant pursuit," were the orders. The entire *Dolphin* seemed to become electric. A stern, grim expression came over the face of the skipper. The rear hatch had been opened and the boatswain's mate was taking pictures.

The picture-taking over—the skipper eased the *Dolphin* back to a more comfortable altitude. Below the suspected vessel had hurriedly changed her course and was heading under full draft for the open Atlantic. Divisional Headquarters has radioed that one of the cutters was within 20 miles of the spot and the *Dolphin* was instructed to keep the vessel under surveillance until the cutter arrived on the spot to make the seizure.

Had a cutter not been nearby, the *Dolphin* was well equipped to carry out seizure orders—the plane carried a full complement of ammunition and the necessary authority—to say nothing of a very fine machine gun. Another hour went by and within sight all the time was this suspected vessel. At hour's end the skipper radioed instructions to Salem for another plane to set out to carry on with the patrol to the north. A few minutes later the cutter came into view—her captain



This burning fishing boat was sighted from the air by a Coast Guardsman. The flying boat is taxiing close to remove the crew.

had obviously spotted the vessel we had been following.

By radio the skipper of the *Dolphin* relinquished the pursuit to the captain of the cutter. The sun was falling slowly into the sea to the west and the gas supply of our *Dolphin* was becoming low.

"Well, I guess that's a good day's work," commented the skipper, as he pointed the nose of his ship homeward, not waiting to watch the dramatic action that was to follow a few minutes later as members of the cutter ordered the sought-after ship to stand by. The newspapers of the following morning told the rest of the story. She had been boarded, seized and towed to Boston. Members of the crew admitted that they had landed a shipment of liquor on the shores of Cape Cod and are, as this is written, securely confined to a Federal prison, out of reach of their activities that are a menace to society.

This flight very definitely indicates the peace-time value of the Coast Guard, but patrols such as this are by no means the limits of the Coast Guard air service. No unit of the government assures more protection to the seaboards of the United States than the Coast Guard air service. At strategic points along the Atlantic and Pacific Coast are air bases of the Coast Guard, ready to swing into action at a moment's notice to preserve life and property.

The base at Salem is one of the Coast Guard's newest and best equipped. In addition to a large hangar—capable of housing two or three *Dolphins* and one or two Grumman amphibians—there are barracks for the enlisted personnel and one of the country's finest seaplane ramps.

I can recall standing at the seaplane ramp at the Boston airport one wintry afternoon, watching one of these Coast Guard *Dolphins* arrive with so much ice on her wings and fuselage that you would wonder if she would ever fly again or not. In command of the *Dolphin* was Lt. Perry S. Lyons, Coast Guard pilot, who had spent the entire night rendering assistance to a crippled vessel which had drifted ashore in the tempest of a sweeping snow storm. Unshaven, cold and hungry, Lieutenant Lyons' only comment was that the trip had been rather unusual—a moment typical of the men of steel who man the flying equipment of the Coast Guard.

I imagine that the Coast Guard air service is the least publicized flying branch of government service. It is—like the Coast Guard itself—under the peacetime jurisdiction of the Treasury Department and, during war conditions, becomes an integral unit of the Navy Department.

The Coast Guard recently received a batch of Grummans like the one above.

Air-minded Henry L. Morgenthau, Secretary of the Treasury, is automatically head of the Coast Guard. Most of his travelings about the nation are made aboard a Coast Guard plane. The pride of the Coast Guard fleet, perhaps, is a Lockheed *Electra*, while a Northrop *Gamma* is much-used for executive purposes. For actual service in guarding the coastline of the United States, the most-used aircraft are the *Dolphins* and Grummans.

Page after page could be written of the heroic exploits of Coast Guard pilots—they are far too numerous and lengthy to be chronicled here. Practically every Coast Guard flight is in the line of duty. Coast Guard pilots have few training flights—such as the Army or Navy. Take the life at Salem, for example. Two or three pilots are constantly waiting in the radio room for an emergency call that will take them at 130 m.p.h. through all kinds of weather to the aid of some suffering person or crippled vessel.

A mid-ocean landing is not unusual for any Coast Guard pilot—yet how many pilots in other branches of our service have even attempted such a thing intentionally? My mind goes back to a night a year or so ago. We were standing on the deck of a small freighter—inbound from Lisbon. We were listed on the ship's log as castaways, having been picked up a few hours before by a life boat from this vessel. We had been in an airplane accident and had crashed at sea. Darkness fell shortly after we did. Perhaps an hour elapsed before the purr of two *Wasp* engines pierced the otherwise quiet of dusk. Even though this freighter was still a hundred miles from shore, a Coast Guard *Dolphin* had found her. The captain of the freighter—a gallant Swede—stopped his vessel while Lieutenant Lyons circled a few times and then squared away far astern of us for a landing. At the suggestion of a member of our little group of castaways, the boat had been headed into the wind as a guide for Lieutenant Lyons. But he needed none. In a few seconds the *Dolphin* skimmed across the water, bounced a few times and settled peacefully on the ocean. A lifeboat was put over and a member of Lieutenant Lyons' crew came aside to inquire the extent of our injuries.

Eight of us had survived the accident—one of our group we had planned to rush back to shore with Lieutenant Lyons to receive hospital care but he had passed away a little while before. Even though the *Dolphin* took off again without any passengers aboard, my heart went out to the Coast Guard air service that night. Without thought of his own well-being, Lieutenant Lyons had pointed his ship into the inky blackness of the unforgiving Atlantic to relieve suffering.

On countless occasions before this Lieutenant Lyons' daring and courage have saved many lives—but it hadn't been my privilege to see him in action before. Today Lyons stands out as an outstanding flyer of our nation. Even his brief vacations from the service have been occupied by flying. A few years ago he was a member of a flying team that manned a Northrop monoplane in the annual Bendix race. Currently you will find him at El Paso, Texas, where he is in command of the Coast Guard base, guarding our United States border along the Rio Grande.

One of the most adventurous flying tales you will ever hear is told at hangar flying sessions at any Coast Guard station. Heroes of the escape were Lt. Richard L. Burke and the late Commander William L. Foley—and the scene was off the Florida coast. They received word one night that a small sail boat with two boys aboard had been caught in the teeth of a hurricane. With scarcely a moment's consideration Burke and Foley set the course of a Coast Guard flying boat for the open sea. After flying about for some time they sighted the crippled vessel. In landing on the raging seas, a main spar on the monoplane wing was shattered, rendering the plane unflyable. However, the crew of the skiff were taken aboard the now-crippled plane. Both motors were running and Burke and Foley put the plane about in an attempt to taxi it ashore.

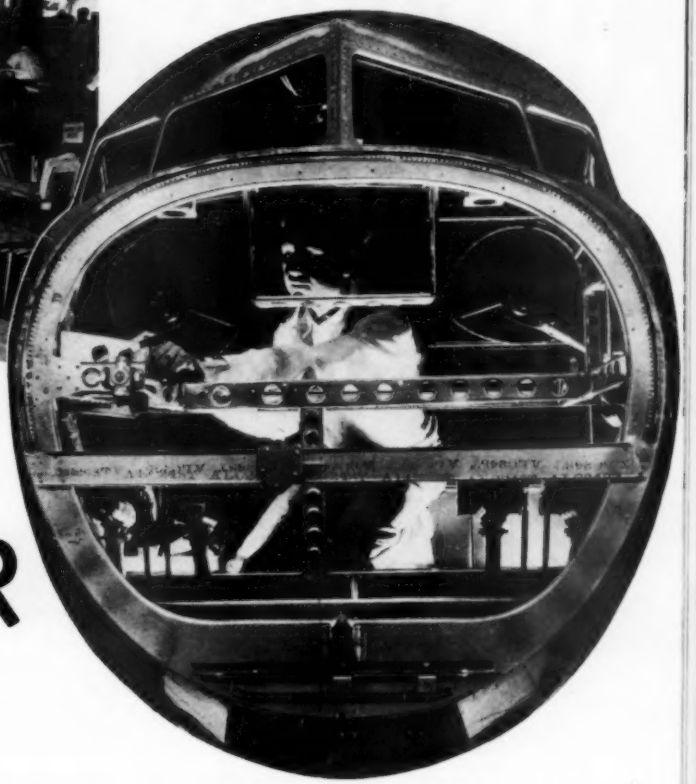
After taxiing all night long, with the

(*Concluded on page 97*)

Contrary to general opinion, the U. S. Coast Guard is not only seagoing. This Stinson flies on inland patrol duty.

The Douglas "Dolphin" is a familiar sight around Coast Guard air bases. This is an ideal ship for rescue work.

Left is the Douglas drafting department.



Building An AIRLINER

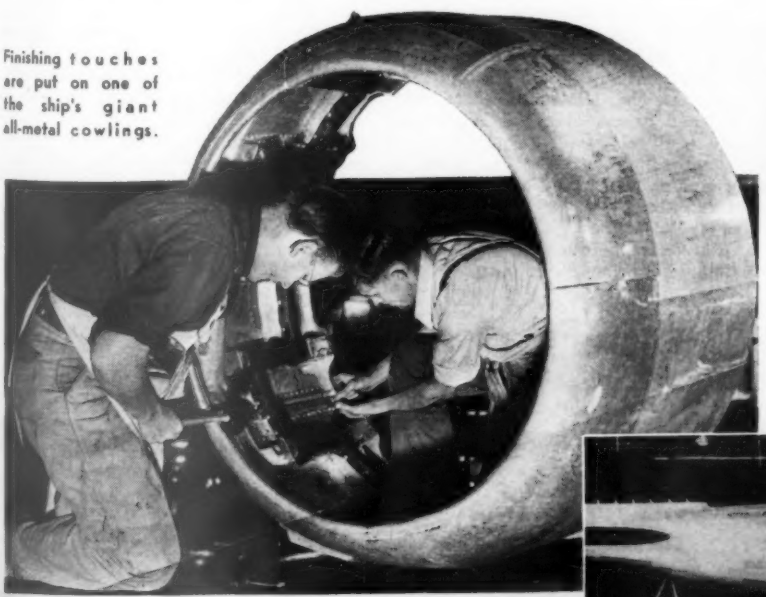
Here is what goes into the building of a modern airliner. The scene is the famous Douglas plant. The model is the famed DC-3.

ONE of the best-known of Santa Monica's industries is the huge plant of the Douglas Aircraft Corporation. From that California city comes the huge sleek all-metal airliners that today are flying air routes from one corner of the world to the other.

The pictures on this page were taken in the Douglas plant. The airplane you see being built is the famous DC-3, successor to the still-popular DC-2. The fuselage in the lower right-hand corner of this page will some day bear the words "Mainliner" or "Skysleeper" or "Flagship" or the insignia of a foreign line but beneath all that this ship is just another DC-3. Douglas airliners are built entirely of metal, covering and all, with the exception of fabric-covered control surfaces. Each ship costs about $110,000.

↑ Controls are being installed in a new airliner's cockpit.

Finishing touches are put on one of the ship's giant all-metal cowlings.



↑ The huge completed wings are lined up on a rack where they await final assembly. Fuel tanks go inside these wings.

↓ A DC-3 sleeper plane fuselage is shown below with outer covering completed. The narrow slots look out of upper berths.

It's Never Too Cold FOR THE ARMY

Even the tiny tricky Army pursuit ships have been adapted to the roughest kind of operations. Top inset is Major (now Lieut-Col.) Ralph Royce who helped pioneer winter flying.

IN THE beginning, flight by man in an airplane was thought of as something that had to be done where it was always fair weather. At least in a place where good weather predominates; for there is no spot on earth that always presents a shining face. As a result of this conception, fields for the most part in the United States during the early history of aviation were located in California, Texas and Florida.

It did not take long, however, for the men connected with aviation to realize this idea would never do. Army officials said, "Something must be done." They knew that in fair weather or foul, in warm weather or cold, man would desire and need to fly. So, they started the study of flight in cold climates, and located fields in the north.

The problems confronting them were: To develop a means to warm up the motor quickly when it is cold; adapt skiis to airplanes; to find suitable clothing for pilots and men; and to prevent the formation of ice on the wings and other parts of an airplane in flight.

In order to carry out their program to develop cold weather flying the Army Air Corps began investigations and research in its laboratories at Wright Field, Dayton, Ohio, and started testing the results of their experiments in their northern-most field.

In 1925 the Adjutant General upon the recommendation of the Chief of the Air Corps authorized the use of personnel and equipment of the First Pursuit Group, whose station was Selfridge Field, Michigan, to make the tests.

Under the leadership of Major Thomas H. Lanphier, this unit departed in the middle of the winter to Van Etten Lake, a point about four miles north of the city of Oscoda, Michigan, where they established a temporary airdrome and named it Skeel Field, a name selected in honor of Captain Burt E. Skeel, a pilot who was killed in an airplane accident at Wilbur Wright Field, Ohio, October 4, 1924.

After spending 66 hours flying time in a climate cold enough to carry out the purpose of the flights the maneuvers proved:

Airplanes could operate when parked in a temperature as low as 10 degrees below zero.

With the use of light oil, if drained, engines could start when the thermometer registered 25 degrees below zero.

By the use of an electric heating device installed on the cooling system, the temperature of a motor could be raised within an hour or two to above zero.

Skiis function better on snow and ice than wheels. During the tests they worked perfectly on the slippery ice of the lake. The take-offs and landings were as though wheels had been used on a smooth runway.

The present type skiis needed to be improved to prevent delay in taking off from deep snow.

The issue fur-lined flying suit was not suitable for the work. It was too heavy and bulky to permit freedom of motion outside the airplane.

It would be wise to have other maneuvers of this nature in order to train personnel and test equipment for winter flights as nothing could take the place of actual experience.

The army found out they had made

Selfridge Field tested winter operations on a frozen lake in northern Michigan. The First Pursuit Group fighters below are early Curtiss "Hawks". Pilots liked the "ice skating".

by A. R. D. GILLIM

There is more to mid-winter Air Corps operations than fur-lined flying suits. An air enemy may conceivably attack in sub-zero weather, so Uncle Sam insists his war birds know their icicles.

Adapting bombers to sub-zero operations was a difficult but important task. Special wheel-skiis at right.

One of the toughest nuts to crack was the care and operation of engines in the freezing weather. Exhaustive tests brought coverings and engine heaters (above).

some progress in adjusting their men and planes to fly in cold weather, but that there was still room for improvement.

Now let us span ten years of investigation by the Army Air Corps and see how far this arm of our military service had gone in its fight to conquer the snow and ice for the airplane. In order to do this it is well to take up another test by the First Pursuit Group; one that took place in 1935.

This flight left its home station, Selfridge Field, the first day of February and returned on the last day of the same month after flying over most of our northern states. It was commanded by Lieut.-Col. Ralph Royce, a pilot who is a veteran of a number of winter flights. It was he who commanded the First Pursuiters in 1930 on a trip in the dead of winter to Spokane, Washington, and, in August, 1934, he participated in the Army's Alaskan flight.

In all 21 officers, 25 enlisted men, and 17 airplanes made up the 1935 test. Hardships were experienced by these men for the fields were in many instances covered with deep snow, and the mercury some days fell to 26 degrees below zero. Weather to test the metal of both men and planes. Naturally, as a result, a few minor mishaps occurred, such as a cowling breaking loose from its engine, and a ski giving way under the strain put upon it by a heavy bomber. But, as a whole, the expedition was considered a success by the Army. It brought out the troubles that still had to be corrected, and the fact that men and planes could endure winter flights for longer periods than they were able to endure them in 1925.

The definite lessons learned from this experience were:

The abandonment of all cold starting, since it imposed too great a strain on the engines, and in lieu of this, to heat the engines by firepots.

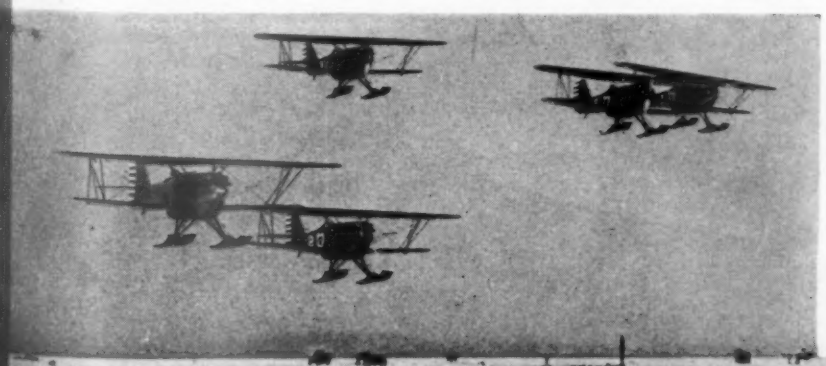
The necessity for redesigning of wheel skiis for heavy ships to permit their cruising closer to their normal rated speed.

The priming of a greater number of cylinders during cold weather, although this is a desirable feature at all times.

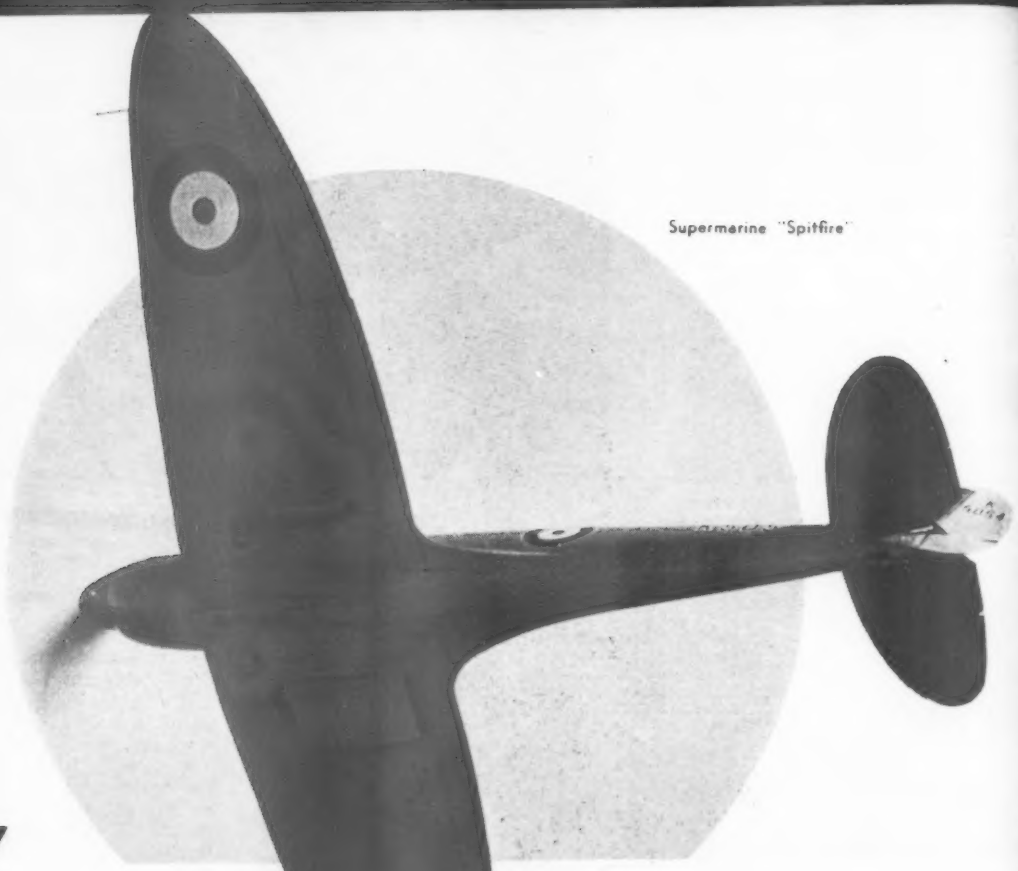
Further development of winter flying equipment. The redesigning of cockpit and cabin heaters would probably eliminate many problems now facing the Equipment Board with reference to winter clothing.

Tightening up the fuselage on all types of aircraft to keep snow out of the tails.

(*Concluded on page* 82)



At left is early ski equipment on Selfridge Field "Hawks". Above is modern engine-heating paraphernalia.



Supermarine "Spitfire"

New ENGLISH FIGHTERS

JOHNNY BULL may have been slow on the pick-up, but once his aircraft engineers got into the stride of things, there was no stopping them—and they're still going, day and night. The photographs on this and the opposite page are proof of that.

These are three of Britain's latest one-place fighters. The worm's-eye-view at the top of this page is of a sleek Supermarine *Spitfire*. The standard R.A.F. model of this ship is powered with a 1,030 h.p. Rolls-Royce engine. A special model of this ship will soon go after the world landplane speed record.

The ship below is Hawker's latest, the *Hurricane*. Powered with the same engine as the *Spitfire*, the *Hurricane* is now in quantity production.

Unlike the *Hurricane* or *Spitfire*, the Gloster F.5/34 on the opposite page is powered with an air-cooled engine.

Hawker "Hurricane"

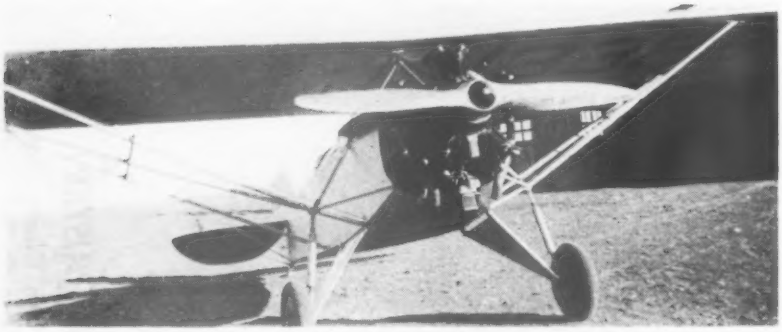
BETTER DUCK, MISTER!

This new, lightning-fast British Gloster fighter is loaded with plenty of sudden death. This view of the ship's business end means "move fast, brother!"

SWAN

Government regulation threatens to put an end to the amateur airman and lightplane builder. Will YOU help fight this injustice?

No "brain truster" put his stamp of approval on this homebuilt ship, yet a California lad built it himself and has been flying it for several years safely.



A homebuilder in Wyoming built this ship (no names are mentioned here "just in case"). When the builder wrote us, the ship had flown almost 100 hours.

This Canadian reader built the above modified Pietenpol himself and his government graciously looked the ship over, approved it and issued a private license.

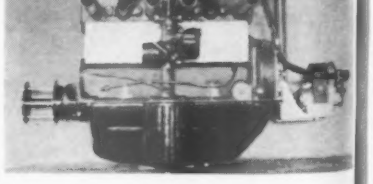
FROM time to time, during the past seven years, we have published a great number of lightplane stories in which we have proudly displayed the ships built by our readers.

This material was not only of interest and value to our readers but we also derived much pleasure from looking at the pictures of the keen jobs designed and built by our friends. As a matter of fact, the pages headed "What Our Readers Are Building" were the most popular of all our features.

However, very few of these photos of homemade planes reach us now, probably because of the ever increasing radius of obstructive state legislation that is stifling amateur endeavor in the United States. Very few lightplanes are now being built by amateurs and the majority of the lightplanes that were built in past years have been shot down by the anti-lightcraft batteries of the state commissions. Once so full of promise, the lightplane building game has faded out like a shadow though defended to the last by the valiant amateurs.

And so, with many misgivings, we are printing a few examples of past glories that may prove to be the last amateur pictures published. We hope this is not actually true but we can offer no promise as to the future appearance of this familiar department. In several cases, over-vigilant state officers have used this column as a means of hunting out certain unfortunate bootleg flyers in their states and it is therefore dangerous to print names or addresses.

Amateur flying and amateur lightplane construction have established an enviable reputation, extending from the Curtiss Tripod pusher era and Demoiselle right down to the latest productions of 1937. There have been very few fatal



The latest Pietenpol is shown at the left. Above is the highly successful Ford engine conversion used in this ship. Though dozens of Pietenpols are in use throughout the United States, we have yet to hear one criticized.

SONG

by J. B. ROBERTS

accidents in amateur flying and comparatively few accidents of any kind. It is likely that one crash of a commercial airliner is accountable for more deaths than all of the deaths due to amateur planes from the beginning of time. This comparative freedom from accidents is due to a number of conditions, but largely to the fact that the amateur thoroughly understands his ship from every angle and therefore seldom takes chances that are frequently taken by other pilots not so thoroughly acquainted with their plane and its capabilities.

Another factor contributing to safety was the low landing speed and the correspondingly low top speed primarily due to the limited amount of power available. Structural defects that might have been serious at speeds of 125 m.p.h., or over, were non-existent at top speeds of 60 to 80 m.p.h. The light wing loadings, made necessary by the limited power, restrained amateur activities to fair weather flying and made low landing speeds possible.

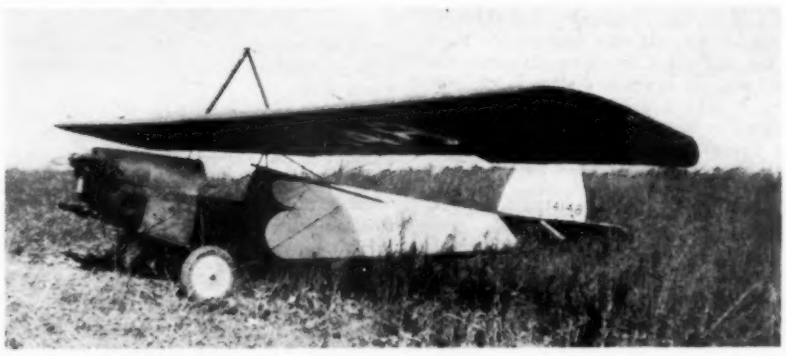
And, again, we must not forget that many of the amateurs were competent engineers, as fully capable of designing and stressing airplane structures as the engineers employed by the large airplane manufacturers. All of the amateurs were at least passable mechanics and some were really superlative mechanics as the workmanship on their little planes amply proved. Of course, there was a sprinkling of beginners of the novice class who were not assets to the game, but trouble from the novices was usually avoided by the fact that their planes refused to fly at all, thus checking accidents at their source.

With manual training for boys to be had in most of our grade or high schools, the majority of our young men have had some experience in handling tools and are more than mere bunglers, even though they might not have had extended experience in actual airplane construction. These boys are hardly worse than many of the inexperienced workers now employed in commercial aircraft factories and, in many cases, have had more thorough training in shopcraft.

After reviewing the thousands of letters sent into POPULAR AVIATION by the constructors of homebuilt planes, we find that very few of these homebuilt

This novel little one-place biplane didn't come down the production line of a big manufacturer but it served its owner and builder for many flying hours.

Here is just another of the many small airplanes in the United States the G-men have a grudge against. The mere lack of a license, though, didn't ground it.



This modified Longster cost two Michigan pilots $150 to build, engine and all, and had flown two years when this picture was submitted. Fred Fagg please note.

Built in an Oklahoma back yard, this trim biplane is powered with a Ford engine, cruises at 75 m.p.h. and tops 85. According to the builder, it is hard to spin and will take off in six seconds. Wing span is 26 feet.

After 10 months a-building in a Wisconsin youth's spare time, three veteran pilots flew this ship and enthusiastically pronounced it safe and airworthy.

ships were flown until they were thoroughly checked up by experienced pilots or air-mechanics. Of course, there were a few planes test hopped by their inexperienced constructors after completion, but as the amateur test-hopper was, in every case, still alive and able to write a description of the test-hop, it can be assumed that there were no serious accidents nor incidents connected with the maiden flight.

And while we are gabbing about homebuilt planes, we must not overlook the myriads of "engine converters" who built workable engines out of every conceivable material ordinarily found laying around loose. It was nothing for them to take a Ford, Chevvy or Plymouth engine and, by ingenious alterations, convert it into a reliable and competent aviation engine that flew the tiny planes for thousands of miles. Some of the Ford engine conversions were really noteworthy and praiseworthy achievements that gave their owners hundreds of hours of reliable service.

Owing to the dearth of light aviation engines in this country, the conversion of small car engines was a prime necessity for the amateur plane builder. Pietenpol and Corben were among the foremost conversion artists and their Ford conversions were of a high standard of design and performance.

Ford engine conversion began several years ago before the World War at the time that the Ford cars had a brass band around their radiators, but it reached its full height and perfection in 1936 at which time there were but few lightplane engines left on the market. Prior to the Ford conversion era, say from 1909 to 1914, there were more or less successful conversions of larger auto engines such as the British-American car engines, Marion air-coolers, Scripps-Booth, Cadillacs and similar engines, some of which were ideal for the purpose because of their thin light copper water-jackets.

After the World War, the pickings were good because of the tremendous amount of war salvage stock on the market that could be had for a song. First, there were the old two-cylinder Lawrence *Penguin* engines that came in useful at this time. Then we had the pick of the Anzani's and the small air-cooled Renault engines fresh from the wartime training camps and a number of post-

(*Concluded on page* 86)

Another view of the ship at the top of this page. A modified Pietenpol, this home-built job showed a 90 m.p.h. top speed. Its first test flight was perfect.

D. S. C. War Aces
by Carl B. Ogilvie

James D. Beane

Residence and born—Concord, Mass. General Order No. 46, W. D., 1919. Near Bantheville, France, Oct. 29, 1918. First Lieutenant, 22d Aero Squadron, Air Service.

When Lieutenant Beane's patrol was attacked by eight enemy Fokker planes he dived into their midst in order to divert their attention from the other machines of his group and shot down one of them in flames. Four other Fokkers then joined in the battle, one of which was also destroyed by this officer.

Posthumously awarded. Medal presented to foster father, Wilfrid Wheeler.

* * *

Arthur R. Brooks

Residence and born — Farmingham, Mass. General Order No. 123, W. D., 1918. Over Mars-la-Tour, France, Sept. 14, 1918. Second Lieutenant, 22d Aero Squadron, Air Service.

When his patrol was attacked by 12 enemy Fokkers over Mars-la-Tour, eight miles within the enemy lines, he alone fought bravely and relentlessly with eight of them, pursuing the fight from 5,000 meters to within a few meters of the ground, and though his right rudder control was out and his plane riddled with bullets, he destroyed two Fokkers, one falling out of control and the other bursting into flames.

* * *

Douglas Campbell

Residence—Cambridge, Mass. Born—San Francisco, Cal. General Order No. 121, W. D., 1918. East of Firey, France, May 19, 1918. First Lieutenant, 94th Aero Squadron, Air Service.

He attacked an enemy biplane at an altitude of 4,500 meters, east of Firey, France. He rushed to the attack, but after shooting a few rounds his gun jammed. Undeterred by this accident, he maneuvered so as to protect himself, corrected the jam in midair, and returned to the assault. After a short, violent action, the enemy plane took fire and crashed to the earth.

Oak-leaf clusters (4). One bronze oak leaf is awarded Lieutenant Campbell for each of the following acts of extraordinary heroism in action:

On May 27, 1918, he encountered three enemy monoplanes at an altitude of 3,000 meters over Montsec, France. Despite the superior strength of the enemy, he promptly attacked, and fighting a brilliant battle, shot down one German machine which fell in three pieces, and drove the other two well within the enemy lines.

On May 28, 1918, he saw six German Albatross airplanes flying toward him at an altitude of 2,000 meters, near Bois Rata, France. Regardless of personal danger, he immediately attacked, and by skillful maneuvering and accurate opera-

(*Concluded on page* 97)

The Club That No Pilot Likes

by T. R. WISEMAN

This is one organization that causes its members to blush at the mere thought of having qualified for it. Many a crack airman, though, has a Dumb-bell Club status.

DURING the hey-day of aviation, before the fateful 'thirties, officers of the 120th Observation Squadron originated the Dumb-bell Club. This was not actually an organization. Like the illusive Caterpillar Club, one became a member without premeditation. Membership was conferred upon officers of the squadron when they had been convicted of an unusually "dumb" piece of flying. Names of these "dumb-bells" were inscribed upon a bronze tablet, above which was mounted a large bronze dumb-bell. This singular trophy was kept in a place of honor in the officers' club, and many and numerous are the tales told of its honor roll.

Although I was never actually a member, I certainly qualified many times. Particularly did I merit the honor when the municipal airport at Durango was dedicated. Lieutenant Bill Boyd and I went down to represent the 120th for the show. We took off with our O-2H's and gave the regular stunt show looping, spinning, spirals and so forth. The motor cut out on my Liberty while I was doing a chandelle. A Liberty motor had the habit of doing that in coming out of this particular maneuver, though it has since been corrected, so I wasn't worried at all—at first. I settled into a glide, but the motor didn't pick up as usual. I moved the throttle up and pushed the wabble pump. I knew then I'd have to land for there wasn't a sign of a purr. I only had two or three hundred feet altitude and landed okay except for cracking the landing gear. The ship turned over—but no broken bones or other serious casualty resulted.

Most of us were distinguished by that same brand of dumbness at that time. We had not yet become used to the idea of a parachute—we never had them during the war—and besides, it seemed better to stay with the ship, if it was possible to land without a bad crack-up, than to take to a parachute and abandon the ship to a crash. Lieutenant Danny Kearns, one of the best of our squadron flyers, went through five major crashes rather than take to a 'chute. After all that ship is valuable property—worth a little extra effort and risk. So often, with half a chance and the right break, a ship can be landed without serious trouble.

Another remarkable "dumb-bell" feat was the trip Captain Hall and Lieutenant Wilson took up near Lafayette, Colorado, in 1927 when the Guard was called out for strike duty. Ray Wilson, a determined, gallant fellow with fine black eyes and a humorous mouth, was flying a Hispano-Suiza, doing some observation duty, and the oil plug on the tachometer drive came out while they were about a thousand feet in the air. Lieutenant Wilson stood on the wing of the ship and tried to plug up the hole with his thumb until they could land, with the strikers firing futile shots from below.

When a pilot gets his name carefully engraved on the above masterpiece, rest assured there's a funny story going the rounds that you haven't heard yet. In some form or other, practically all military air bases possess Dumb-bell Clubs.

I recall another incident which occurred during summer camp drill. It, too, might have been serious but time has mellowed it into a "dumb-bell" story. Captain La Gue, a stocky, well-liked officer, who looks like an Irishman in spite of his French name, was maneuvering over the gunnery range, about 50 feet off the ground when the brake rod broke. Lieutenant Ray Wilson was at the controls and he turned them over to Captain La Gue while he climbed outside to try to repair the trouble. All the time he was down under the ship, trying to fix the rod, La Gue kept kicking the rudder controls, which interfered seriously with Ray's efforts. Finally Wilson climbed up to give La Gue a piece of his mind, and found the Captain had used the rudders as the only way to attract Ray's attention, to the fact that he had no stick control in his cockpit. Ray decided to land without making repairs!

Among trips which I remember particularly and which should have earned us our dumb-bell distinction, had we not already earned it many times, was a fishing excursion into Wyoming. We took a PT-1 (Primary Training) and flew by way of Laramie up near Elk Mountain. The ranch owner, Dr. Tillson, had planned to mark his hay field by a tarpaulin, laid down so we could see it from the air, in order to know where to land.

Dr. Mumey—our flight surgeon—and I took off early in the morning, although we got into the air with difficulty, because the PT-1 was an underpowdered ship, and Doctor Mumey no lightweight, and the fishing tackle, as well as myself, added greatly to the load. We stopped at Laramie for gasoline and then tried to take off. We took a full run of the field without getting off the ground. I waited until I could see the wire on the fence before starting to rise. Just managed to bounce over the fence and landed again on the other side. Fortunately there was plenty of prairie on the other side of the fence, and we rolled along until we could get up enough speed to get into the air. Laramie is 2,000 feet higher than Denver, or about 7,000 feet above sea level, so we dared not carry full tanks of fuel because of the weight.

We found Dr. Tillson's tarpaulin very easily when we got to Elk Mountain, but when I saw the meadow I knew we'd never get up in the air again if we landed there. The weather had recently been very damp and the field was muddy. With our heavy ship and the human freight, we'd be unable to lift the wheels out of the soft clay. So I looked around until I could find a good piece of sage

brush prairie in which to land. We landed all right, although the sage was as high as the wheels of the plane, and the landing was rough.

We had a good time, got lots of fish, and when ready to leave, took off on the highway. I dared not risk either the soft clay meadow of the sage brush hazard. Cross winds took us out of the direct route and I found I'd have to circle around Elk Mountain to get back on our course. Circling around this elevation, the farthest eastern sentinal of the Rockies at this point, it seemed to brood relentlessly, hovering in the background all the way to Laramie with a promise of disaster. We were short of gasoline and the extra mileage caused by our long trip around the mountain had used even more of our scanty fuel supply than I had counted on. I was exceedingly uncomfortable when I discovered that besides fuel shortage, I would have to fight a heavy headwind all the way to Laramie.

The P T—1, loaded as it was, could hardly do more than 70 m.p.h. in this heavy wind. It looked bad. All the way I kept my eyes anxiously searching the ground for any possible landing fields. I flew down close—about 200 feet above the ground and cut down the motor as much as possible to save gasoline.

Circling over Laramie at last, I heard the warning sput-sput of an empty feed line. Coming in on the wind I managed to glide down, got on the field without any trouble and right side up—but the tanks were as dry as a bone.

Another dumb-bell club member earned his title when he decided to try a practice blind-landing. Instead of using the customary method, however, when he got ready to land, he shut his eyes. The men, watching, saw him hit the ground hard and bounce up into the air about 80 feet. This qualified him for his dumb-bell plate. I believe in this instance we accounted for the damaged landing gear by passing the buck to the inspection of the engineering department.

Lieutenant Eddie Brooks qualified in a way we still laugh over. The squadron was taking off in formation flight, and after warming up, it took quite a few minutes to get the ships in exact position to take the air. Eddie was flying and Lieutenant Roberts was the observer. While getting in position Roberts left the plane for something but Eddie didn't see him leave, and took off without him. Roberts came back into the office, laughing to beat the devil and told how Eddie had gone without knowing he was out of the ship. The boys hid Robbie and when Eddie got back they told him he must have lost his observer while in the air. Eddie rushed wildly about looking for some trace of Roberts on the ground over which he had flown. When he came back to the office he found Roberts and the boys patiently waiting for their laugh.

During a cross-country trip into Wyoming, Capt. Aubrey Keefe and sergeant Schaefer were warming up the motor to

(*Concluded on page* 83)

the NATIONAL AIR BOARD Says...

Dr. Alexander Klemin, Chairman

BERNARR MACFADDEN, publisher of many magazines and newspapers and a private plane owner who does his own piloting, honored the 20th meeting of the Air Board with his attendance. Mr. Macfadden has by precept, example and generous expenditure done a great deal to popularize private flying. Waldo Waterman, the well known west coast designer, was also a welcome guest and brought much of interest to the meeting, with frank and novel comment.

A New Device to Detect Enemy Aircraft

Electrical waves differ mainly in wave length. The longest waves are used for radio; shorter waves are infra-red or heat waves, invisible to the eye but detected by our skins; shorter still are light waves, then come ultra-violet waves and finally cosmic rays. It is hardly necessary to say that science has now provided with instruments for detecting all or any of these waves, however slight their intensity. A delicate thermo-couple or adrometer placed at the focal point of a parabolic mirror will measure the heat radiating from a distant star. The same principles which are employed in astronomy have now been applied in a device for spotting airplanes 20 miles solely by a delicate heat detector which in pitch dark or otherwise impenetrable fog will react to the infra-red rays emanating from the motor. Experiments made at Fort Monmouth, New Jersey, by Army engineers have combined heat detection with automatic triangulation which can be achieved in two seconds. A member of the Air Board, pledged to secrecy as to details, assured the members that the device was entirely practical and successful, and a welcome addition to our national defense.

All's Well that Ends Well

A recent newspaper announcement quoted here, was disturbing to every pilot in the country, particularly to airline pilots.

"Seventeen first pilots on United Air Lines' coast-to-coast system, or more than 10 per cent of all those holding such positions with this company, have been discharged with the curtailment of flying schedules incident to the advent of winter, it was learned yesterday. The move marks a sharp departure from the policy formerly followed by United and other operators of making seasonal reductions in pilot personnel on the basis of seniority, some of the men let out now including veteran airmen who have been with the line since its organization ten years ago.

"Other officials confirmed the fact that several of the line's 'million-mile' pilots have been eliminated in the weeding-out process, together with younger men who have been acting as captains of United's airliners for only a short time. It is understood that the old-timers, in the company's estimation, were not keeping pace with the complicated equipment and altered technique of modern air line flying, while the newcomers who were let go did not measure up to the line's rigorous requirements."

Mr. Ray Quick brought a welcome word of reassurance. All but five of the 17 discharged pilots have been returned to duty. The reason for the stern step was not in reality a measure of inability to keep up, or incapacity to learn, but a measure of discipline. These pilots were paying no attention to notices on the Bulletin Board, not heeding orders, and generally trying to run the airline. Now they have been reinstated on the understanding that orders are orders. Many flyers will learn the news behind the news with relief, and no one can question the absolute necessity of discipline on the airlines.

Bright Prospects for Small Planes

Said Waldo Waterman: "The automobile is nearing the saturation point, but the airplane will never reach the saturation point". According to Mr. Waterman 10,000 airplanes for personal use will be built in 1938. There will be built 4,000 Piper *Cubs;* 1,000 ships by Taylor-Young; Luscombe Aircraft already is sold out, Aeronca is anticipating the largest sales in its history, and other firms are equally hopeful. And this at a time when General Motors have laid off 30,000 men!

The Truth Regarding Airplane Inspection

The public is convinced that our airplanes are splendidly and thoroughly inspected, and gives all credit to the Bureau of Air Commerce. It is perfectly true that our airplanes are indeed well inspected, and that the inspectors of the Bureau are a capable and conscientious body of men. But 80 per cent of the Bureau's funds apply to airlines and airports, and very little is left for the inspection service. It is physically impossible for the few men at work to do a thorough job on every airplane now in use. Ray Brown gave a graphic picture of what really happens. The inspector shows up once a year, hails the licensed mechanic, asks him how No. 317 is stacking up, when she was last overhauled, and passes her through. This is within the law, since the law allows the Secretary of Commerce to delegate inspection authority, and entirely satisfactory since the experienced mechanics are far better able to judge of the condition of a ship than any visiting inspector. *"Why not"*, asked Casey Jones, *"recognize*

(*Concluded on page* 78)

Flying in British Columbia

by S. R. CANNINGS

Up in the far north the airplane is as important to the few people living there as the automobile is to us. Primitive British Columbia uses aircraft exclusively.

AVIATION in British Columbia is interesting and different almost as different as in that great Pacific Northwest province itself.

Travelers are amazed at the diversity of scenery and climate, particularly the climate. Do you know that you can play golf or pick roses at Christmas time in some parts of B. C.?

Some flying activities in this mountainous province would surprise you. In northern British Columbia, mining development depends almost entirely on the airplane for transportation and supplies. There are no roads nor railways in this vast area.

The variety of cargo carried by the "sky tramps" of British Columbia are unusual to say the least. Picture a respectable Boeing 247-D or a Lockheed *Electra,* carrying cook-stoves, dog teams, wheel-barrows, odd lumber or baled hay with the odd stove pipe sticking out of the windows for want of room! It sounds funny, but that's a load typical all over northern Canada.

Added to this, a canoe is often lashed under the fuselage or even two canoes, one on each side. Strangely enough, this is said to slow the ship down only about 10 m.p.h.

These aircraft aren't subsidized either. The country depends on the airplane up here, instead of the airplane on the country.

The entire milling machinery for the Taylor-Windfall gold mine in the Taseka Lake district was flown in from the railhead by a Junkers seaplane. Last winter, supplies were being freighted in by a Fairchild "51" on skis. Soon the gold will be coming out—by air. Both these machines are equipped with two-way radio, to lessen danger in case of forced landings in the northern wilderness.

This Fairchild, by the way, now rebuilt and with a new Wright engine, was formerly the old razorback Fairchild G-CAIH of Canadian Airways which went to the rescue of the *Bremen* flyers, stranded on Greenly Island in 1928.

The Fisheries Patrol is probably a new kind of air patrol to most of you. It is a government service for the protection of fisheries on the British Columbian coast, from Alaska to the U. S. boundary. Seaplanes and flying boats are used to help detect fishermen violating the commercial fishing laws, such as fishing in closed season, in restricted areas or use of excessively long nets.

The first aircraft used on this patrol was an old Curtiss HS2L flying boat in 1928. It was Liberty-powered and piloted by Major D. R. MacLaren, famous Canadian war ace.

Speaking of fish, most of us are more interested in the sporting varieties. British Columbia is ready to give you surprises in the way of trout, but you'll have to fly into "them thar hills" to get the best. One pilot, operating a charter service, says the average big trout in his district weighs about 40 pounds.

Landing his seaplane on Two Boys Lake with a canoe and five hunters recently, this pilot reports surprising eight ptarmigan, one moose, three caribou and two bear, within one hour's walk of camp! Besides saving days of surface travel, the sky-riding big game hunter has the advantage of scouting his game from the air before landing.

This frigid outpost is a typical representative scene in the far north. American aircraft are used most.

Another type of sportsman who is fast becoming airminded in this great sportsman's paradise, is the mountaineer. The most tedious part of mountain climbing is often reaching the foot of the mountains. In British Columbia, where lakes are often conveniently located, the seaplane is used to make this part of the trip easy and more enjoyable.

Probably, the most popular peak among Pacific Coast alpinists is Mt. Garibaldi in Garibaldi Park. Near the base of this mountain lies Garibaldi Lake, about half an hour's flight from the city of Vancouver. The conquest of Mt. Garibaldi can be accomplished in a single day if the airplane is used to the lake and back, otherwise the journey requires several days.

Last summer a party of climbers from California used a Boeing boat to start their attack on the still unconquered Mt. Waddington. They had a grand time, but they didn't quite make it. Come up and try it sometime.

By now you must think flying in British Columbia is all "up in the sticks." So before we're through we'd better look at some of the more civilized activities.

Vancouver, Canada's third largest city, is naturally the busiest aviation center in British Columbia. Here on Sea Island in the Fraser River is the finest airport in Canada—and that's not just the writer's opinion. It is a combined land and seaplane port with modern steel and concrete hangars and administration building, radio and weather equipment and hard surfaced runways.

Here among many private, commercial and military activities the Aero Club of British Columbia has its club rooms and operates three *Kinner* Fleets, one on floats with a fourth, equipped for blind flight instruction, soon to be added.

The Royal Canadian Air Force seaplane training base is located at Jericho Beach, Vancouver, where a large number of seaplanes and flying boats are stationed for pilot training and photographic work. These machines are also used by the famous red coats of the Royal Canadian Mounted Police on their patrols for the suppression of narcotic smuggling.

A Canadian Airways D. H. *Dragon Rapide* carries the airmail from Sea Island to Boeing Field, Seattle, and will soon start taking passengers as well. The same company operates a mail and passenger seaplane service to Victoria, the capial city. This "Follow the Birds to Victoria" trip, over the island studded Gulf of Georgia, is said by seasoned air travelers to be the equal of any in the world.

Airmail from the Orient, destined for the East and Europe, is taken off C.P.R. *Empress* liners at Victoria and flown to Seattle, where it is transferred to eastbound planes. This service, started in 1919, was the first U. S. contract air mail service.

It is interesting to note that the Boeing flying boat, which started this serv-

(*Concluded on page* 90)

Letters

THE following letters are just a few more we have received following the publication of "They Said I Couldn't Fly" in the December issue. POPULAR AVIATION, *though long aware of Bureau of Air Commerce shortcomings, was little prepared for the flood of mail that followed the article. It will take us at least one more issue (also see the February issue) to publish only the excerpts of important letters, each of them containing some new example of governmental bureaucracy.*

Illegal Instruction . . .

Sirs:

I have safely driven a car for several years—although my vision is impaired much as is Mr. Karant's. These defects do not bother me in the least until I enter an eye specialist's office. Then they are bared in the face of a lot of scientific testing apparatus.

I have a total of five hours and 20 minutes (illegal) in a powered airplane as well as some glider time. I have safely flown two types of ships without benefit of a student permit. Although a capable licensed pilot was riding with me, he very seldom—if ever—touched the stick. The ships were a Taylor *Cub* and a Nicholas-Beazley NB-8. I learned under a rather bad handicap, as I had four instructors and two different airplanes. We also had to fly some distance to a private field to practice landings.

I, like Mr. Karant, fully intend to own and operate my own ship as soon as I can afford it. W. L. W.

Ohio

"Illegal" flying in the United States is far more common than is generally believed.—The Editors.

* * *

Chute Jumper . . .

Sirs:

When I took my examination a few years ago and paid ten dollars to have a doctor tell me he would like to pass me but that he felt personally responsible for each flyer he examined that crashed, I tried to understand. So what did I do? I haunted flying fields. I rode as a passenger when I could and began noticing that when a landing was made I had just as much judgment as the pilot (the doctor told me I couldn't judge distance either—that I couldn't tell whether I was ten or a hundred feet off the ground). I began to wonder if I had gotten a fair deal, so I took another examination for my eyes and got the same answer: "It would be murder to put me in a ship".

One day I saw a parachute jump and talked to the jumper. I was very much interested, as I am in anything connected with flying. I told a friend of mine, and he suggested that we try to make a jump. We went over to the jumper and made arrangements. I didn't tell the jumper about my eyes right away, but later on during our course of instruction I did. He informed me that the Department of Commerce did not compel *any physical examination at all.*

My intention was to make only one jump, but the one was so much fun that I made another and another and am now a professional jumper. I have been jumping for nearly four years without once making an error in judgment (or I wouldn't be here to tell this) but still the Department does not ask me whether I can see two feet in front of my nose or not. If this is consistency I will eat every crummy chute the Department of Commerce owns. Don't get me wrong. I am not jumping for my livelihood, because I have a fairly good job and am not underselling any other jumpers or riggers. If the Department wants to take exception to what I am saying and go gunning for me, let them. I obey their parachute regulations and play ball with them, even though I don't approve of their domineering powers.

An airplane settles just as slowly as you desire in an ordinary glide. According to the Bureau of Air Commerce I might not be able to judge how far off the ground I am. But, I can go anywhere from 2,000 to 60,000 feet up and jump out into space with a silk rag tied on my back—which they do not even require a test drop on, regardless of age. If I drop 120 m.p.h., that is over 100 times as fast as an airplane settles horizontally.

Now that I've gotten my 'chutes off my mind, I would like to add that I've flown from time to time, made landings, and had arguments with pilots who claim I have more hours than I say I have.

I have driven a motorcycle down a 20-foot road at 102 m.p.h.; I have driven automobiles down those same roads at 97 m.p.h. and have approached and passed cars coming toward me at a combined speed of over 120 m.p.h. *with only two or three feet between us,* as has many another normal driver. But the Department of Commerce says I can't see well enough to set down a ship on a field 500 yards wide at 45 m.p.h. LOUIS A. BARR.

Washington, D. C.

* * *

Ear Trouble . . .

Sirs:

In the beginning, of course, it cost me ten bucks, every cent of it hard-earned cash. That wasn't so bad, but when the medical examiner ungraciously informed me that I positively couldn't fly due to the fact that my left ear-drum was broken, I felt rather depressed. I pleaded so insistently, however, that my case was referred to Washington, and after a considerable length of time I was granted a permit to fly. It was labeled "Student Restricted" and accompanied by a letter that very plainly stated that I need not apply for a higher license until I had *double* the amount of flying time ordinarily required. I don't mind saying that I felt pretty blue. I just stuck my permit away (after all, I'm not very proud of it) and struck out to learn to fly. Since that day I have acquired a wonderful lot of experience. During this time I have experienced some of the most harrowing cross-country work ever experienced by any pilot.

Somehow my bad ear has never affected my flying. My sense of balance seems O.K. Nothing would please me more than the opportunity of taking a medical examiner for a hop over town. I would then let him be the judge as to whether or not I could fly. LEW GOURLEY.

Shoshoni, Wyoming.

* * *

"I Have 200 Hours" . . .

Sirs:

To begin with, my father owns this airport which has been operating since 1919. Naturally, I have been around airplanes all my life, been riding since I was 3½ years old. I was born with one poor eye, but two years ago the Department of Commerce got real good-natured and issued me a restricted student permit with a letter saying I would have to get double the required time for any grade of license.

Well, I promptly bought myself an Aeronca and started in getting that time. I have just about 100 hours on that. Also have an Argo with a Hess *Warrior* motor, and have put 78 or more hours on that and a few hours on a Travel Air, *Cub* and Taylorcraft.

Now, after flying nearly 200 hours, the Department decides it is time to rule me off the list. That permit expired. I tried for months before that to get permission to take a flight test for a private license, but it was no use. In all those hours I have never had the least sign of an accident.

I am not looking for anything commercial; just flying for pleasure. With a hangar full of ships, an airport in your own back yard—and the ability to fly as well as any of the boys, it just burns me up to watch the others go, or perhaps ride with someone who cannot fly half as well as I can myself.

Mr. Karant says "bureaucrats or no bureaucrats," he is going to fly his own ship. How is he going to overrule the Department? I should like to try too.

EVERETT L. KING.

King Field,
E. Taunton, Mass.

* * *

"I Am Going to Be Fair, My Boy" . . .

Sirs:

I had been taking instruction in an

(*Concluded on page* 91)

OLD FAITHFUL
The Vought "Corsair"

An Airplane Runs Away!

HERE are on-the-spot photographs of a humorous but dangerous "rodeo" that was staged at Floyd Bennett Field, Brooklyn, New York, one afternoon recently. The ship was flown into the field by a visiting pilot (extreme right of the above photograph). The Ford engine stalled and the pilot carelessly climbed out of the cockpit, leaving the ignition on. Attempting to start the engine himself, he pulled the propeller over and the battle was on. The engine roared to life and darted around the field at from 35 to 40 m.p.h. while frightened airport attendants attempted to throw bricks into the propeller, jump aboard—or lasso it, as the photo below shows. Meanwhile, more than a dozen ships circled over the field, unable to land. An equal number dodged behind hangars on the ground. Finally an unidentified member of the New York Air Police leaped on a wing and cut the ignition.

Dumb-bell Club Candidate?

THE Army Air Corps was taking delivery on some new observation planes. An excellent story seemed in the making, so the Chief of the Air Corps was approached. Wrote my managing editor: "I'd like to have one of my men fly from the west to the east coast in one of these planes during a delivery flight. . . ." The Air Corps chief agreed. Two weeks later I reported to the Douglas factory and asked for Captain Blank. He had just arrived and was waiting for me. Our first take-off for the east ended 45 seconds after it started. The Captain took off and ran into a thick sea fog a quarter of a mile from the field. We whizzed around a nearby golf course a few feet above the ground, the Captain picking a cautious path in and out of holes in the fog. After landing safely back on the Douglas field again, the Captain commented: "Well, there'll be no more flying today."

In three days we reached San Antonio, Texas, for a glimpse at Randolph and Kelly Fields. The next hop was to Belleville, Ill., by way of Muskogee, Okla. Between Muskogee and Belleville, I found my parachute quite uncomfortable. While squirming about the cockpit to find a comfortable sitting position, I heedlessly succeeded in tripping the rip-cord and out blossomed the innards of the parachute. For the remaining 300 miles into Belleville, I thought in horror what would happen if the Captain decided we'd have to jump for any reason. I had managed to gather the chute in before it did any damage. At Belleville, the Captain was furious. Result: A lot of fine material for some excellent Air Corps stories. . . .

On Air Racing

THIS summer we have witnessed the various air race meets organized throughout the country, and whereby will have been exhibited to the public eyes every possible type of modern high speed plane, intricate maneuvers perfected throughout the previous year by our best acrobatic pilots, along with a program of interesting stunts, all that go to make up the "big show."

The subject of air racing has been argued innumerable times by competent authorities and severely criticized by less "competent" authorities, who are bitterly reactionary with nothing better to offer to take the place of air racing.

After all, air races occupy a definite layer in the various stratas that comprise the industry. The aviation family is a big one. It covers the field of transportation, military and naval science and tactics, technical developments and experimental projects, manufacturing, commercial and private flying, and enterprises of this nature, establishing of necessary records as a measure to gauge development, invention, and air racing.

The critics must be tolerant and realize that after all those that sponsor, partake and enjoy the manly art of air racing technique, have a right to existence as well as the other various phases of the business as a whole. How many times has an air race official or person interested in racing ever criticised the other fields of flying activity? Yet poor old racing suffers the brunt of a tirade of irate writers, who constantly belittle what it accomplishes and still struggles to keep its existence intact in spite of adverse criticism.

The Age of the Air is not being presented as a big ballyhooded circus at all. If it did perhaps racing would come out of the red. Roman holidays and air races are used synonymously, which is contradictory to the old adage "All work and no play." Racing is the "play" period of the industry. Since without some incentive, can anything be so droll as an air meet without racing, and a few of the stunts that enliven things at these affairs? Both types have been tried on the present generation and the "safety first" type of meet went out of business.

It is not advocated that pilots should crackup or suffer injury to thrill the public. The majority of the public sickens at the scene of disasters. It is also not advocated that reckless flying or reckless pilots should be tolerated either.

Now and then at the flying meets some member of the "visiting firemen" does get ambidextrous and commits foolhardy stunting, but I wonder how many times the spectators were endangered intentionally? I can say very few.

There are times when to please an audience the performers lay low so the customers can see what's going on. Sometimes the wind has something to do with it. There are numerous things a performing aerobatic expert has to consider.

(*Continued on page 87*)

Superchargers for Aero Engines

by B. J. Von BONGART

For the mechanically-minded aviation fan, this article should answer a great many questions. Superchargers always have been an interesting subject for the amateur.

THE supercharger, so-called, is but an air compressor used to pump carburetted fuel into the engine cylinders. Such compressors (superchargers) may be of the "positive displacement" type shown by Fig. 1 or of the "centrifugal" type as in Fig. 2.

The centrifugal blower illustrated in Fig. 2 consists essentially of a bladed wheel or "impeller" revolving within a housing up to, perhaps, 24,000 r.p.m. and generating a pressure of from 2 to 12 pounds per square inch, depending upon the speed at which it rotates. A number of present-day radial aviation motors are equipped with the blower shown by Fig. 2.

In some instances, they are merely "rotary inductors," that is, blowers intended to overcome the negative pressure or vacuum existing in the intake manifolds, a vacuum of from 1½ to 2-pounds gauge at wide-open throttle is usual for all engines aspirating by virtue of the downward movement of the piston in which case a positive blower pressure of 2 pounds gauge suffices to counteract the pressure drop within the manifold.

If, on the other hand, it is desired to overcome the diminishing "breathing capacity" of the airplane engine operating in the rarified upper strata, at altitudes of over 5,000 feet, then a rotary inductor no longer suffices, but must be replaced by what is known as a supercharger. The pressure that such a blower must then deliver may be in the order of 6 to 15 pounds gauge, depending upon the altitude at which the motor must deliver its sea-level power output, or at least not less than 75 percent of sea-level power.

Unfortunately, superchargers able to maintain sea-level power output at the higher altitudes impose an immense strain upon the working parts of the engine when the latter is operated at or near terra firma; particularly when the plane is taking off or while flying at low altitudes.

Designers of airplane engines have tried to overcome this serious handicap by providing a train of gears through which the rotative speed of the impeller may be varied to permit the production of lower pressures at low altitudes. The complications inherent in such a gearbox, and the difficulties encountered when changing from one gear-ratio to another, have militated against the adoption of such a device; hence supercharged aviation motors are being operated at partly closed throttle and thus at reduced horsepower output at low altitudes.

On the whole, engine designers have featured superchargers merely as an aid to maintaining full or nearly full horsepower output at higher altitudes; another advantage—the use of superchargers as an aid to piston and valve cooling has only very recently been thought of.

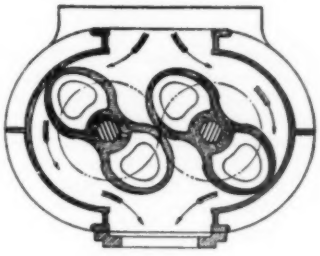


Figure 1

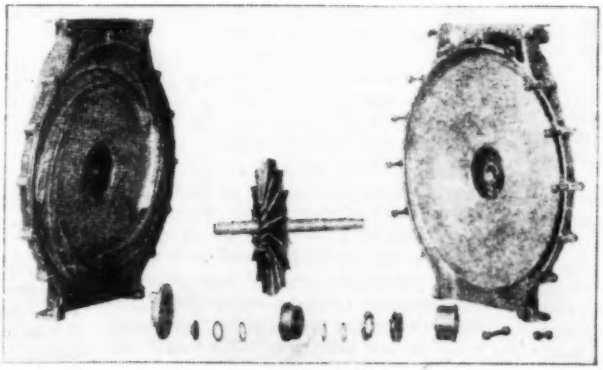


Figure 2

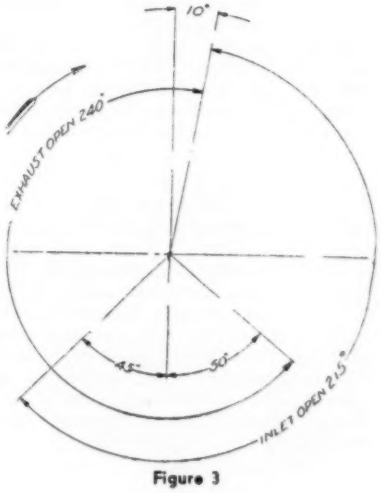


Figure 3

Abroad, and to a limited extent in the U. S. also, a novel and unorthodox valve timing is being employed, where the intake as well as the exhaust valves are opened simultaneously; that is, the openings overlap one another at from 90° to 140° (crank angle degrees). To fully explain this, the usual valve timing is shown in Fig. 3.

As will be seen, an aviation motor not requiring great flexibility may be timed, irrespective of whether it is supercharged or not. The intake valve opens 10° past T.D.C. and closes 45° past B.D.C. The exhaust valve may open 50° ahead of B.D.C. and closes 10° past T.D.C. The spark may occur 25° before T.D.C.

Thus, the intake valve opens when the exhaust valve closes where no supercharger is used. Some designers open the intake valve 5° before T.D.C., the valves then being overlapped 15°. Under normal conditions, as represented by the diagram, the intake valve remains open for a total of 215°, the exhaust valve remaining open for 240°. A novel valve timing in conjunction with supercharging is depicted in Fig. 4.

It will be observed that the intake valve opens 80° ahead of T.D.C., and closes the usual 40° past B.D.C. The exhaust valve opens as usual 45° before B.D.C. but closes 60° past T.D.C.; hence intake and exhaust valves are open simultaneously for the unprecedented period of 140°.

Solid fuel injection by means of a pump may begin 30° ahead of T.D.C. and the spark may be set to occur some 22° to 25° before T.D.C.

Obviously, such totally unorthodox valve timing is not possible with carburetted mixture supply but the results obtained with such an arrangement are truly astonishing. An unprecedented increase in horsepower per cubic inch displacement is but one of the results thus gained. The main feature lies in the piston and (exhaust) valve cooling thus made possible.

The compressed air as delivered by the supercharger drives the exhaust gases

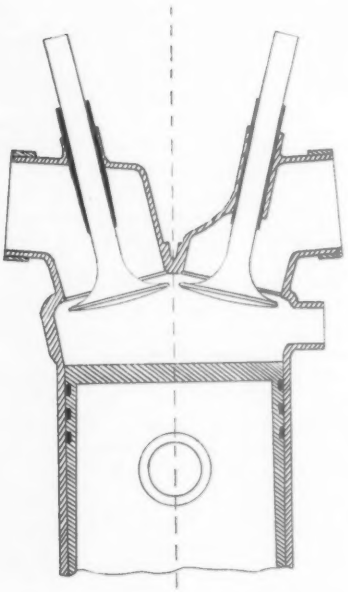
out and, as the comparatively cool air stream continues to blow over the piston-head and past the exhaust valve, a degree of cooling is thus obtained not heretofore even dreamed of.

Thus far, it has been axiomatic that, for air-cooled motors, a piston-head surface of some 30 square inches represents the very maximum that could be successfully used. With the above valve timing and solid fuel injection, cylinder bores of 165 mm. have already been employed and the limit is not yet in sight.

The cooling action obtainable by blowing compressed air over piston-heads and past exhaust valves is remarkable indeed. An experimental cylinder head of the form customary for aviation motors is shown in Fig. 5, both intake and exhaust valves being shown open.

The optimum amount of valve overlap for any given motor cannot be reduced to a formula since it involves no less than eleven variables:

(1) Area (clear) of both intake and exhaust valves.
(2) Piston area in relation to effective valve area.
(3) Total cylinder displacement in relation to valve area.
(4) Mean average temperature of the motor.
(5) Average temperature of the compressed air as delivered by the supercharger.
(6) Pressure in pounds (gauge) as furnished by the supercharger.
(7) Degree of cooling required for a given size of motor.
(8) R.P.M. of motor.
(9) Pressure in pounds (gauge) required so as to obtain greater h.p. output than could be had with natural aspiration.
(10) Altitude at which motor is to maintain sea-level power output.



Aero-engine cylinder cross-section.

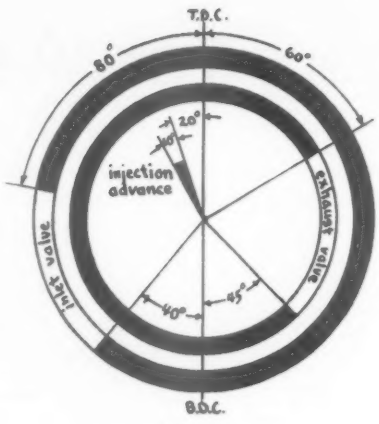


Figure 4

(11) Quantity and pressure (gauge) of compressed air supercharger may furnish without diverting too much of the engine power output (in the case of gear-driven compressors) or creating too high a back-pressure in the case of exhaust-driven compressors.

The latter method, driving the supercharger by exhaust-gas pressure is rapidly coming to the fore, since it eliminates all tendency of the vibration of the gear-driven compressor to come into phase with the periods of vibration of the motor proper, a feature of prime importance for transport or military planes. Furthermore, an exhaust turbine properly designed to drive the supercharger acts as a most effective muffler, silencing the engine's exhaust.

Planes flown abroad are practically silent to observers on the ground except for the whir of the propeller and whatever "singing noise" may be caused by the structure of the plane while in flight.

As previously stated, supercharging with carburetted fuel presents difficulties for such engines must not be "opened-up wide" at low altitudes. With "solid fuel injection," on the other hand, the compression pressure need not be throttled, since the power output and the speed of the engine are regulated by the amount of fuel injected, the air charge remaining constant. Since a weak mixture burns more slowly than a rich one, engines with solid fuel injection do not detonate nor pound as readily as high compression engines fed with carburetted fuel.

This accounts for the reduced detonation factor in spray engines.

It is to be hoped that American designers of aviation engines will investigate this problem of piston and valve cooling by means of compressed air. The determination of the proper valve timing (overlapping) presents difficulties that must be solved for each particular type of engine but it is well worth the effort. Those experienced in this field need no more than two or three experimental cam layouts to readily fix the optimum valve overlapping for any given case.

END

Flying Newshawk
by William Leonard

THE insurance company could see no humor in flying as ballast in an airplane after passenger flights had been cancelled because of high winds. It was close to midnight and the 200-mile run took over four hours (within a few minutes of the gas supply). At an intermediate stop, I joined the station agent in sprawling across the fuselage to keep the tail on the ground while the mail was transferred. Nor did they see anything funny about flying to Toronto one foggy afternoon, gaining 12 miles *in the wrong direction* after two hours flying. The tribute here is to marvelous flying in an all-but zero-zero condition. . . .

* * *

MY heart still beats faster when I think of a refreshing flight along New York's East River and under the 59th Street bridge between Welfare Island and Manhattan. Even the insurance broker didn't like that story. I should have known better because I'd flown under Detroit's Ambassador bridge with the same pilot. He's a swell pilot—one of the best—but, the broker points out, the airlines don't do that. . . .

* * *

THE three hours that were spent milling around in and out of clouds trying to get from Spokane, Wash., to Missoula, Mont., didn't seem to count as far as our insurance pals were concerned, because that was on an airline. But objection was voiced to taking a tour with a Department of Commerce inspector to write a series on how the Department checks up on goings-on in the back woods. The discord arose when the inspector undershot the field to the tune of a new propeller and landing gear.

* * *

ANOTHER great big event which was swell for airplane coverage was the total eclipse of a few years back. Three days before the eclipse the managing editor took to placing his staff at various vantage points throughout New Hampshire and Maine. Everyone who had been picked for the job was assigned except me. All he said was, "You might just as well fly and see how it looks from the air."

Here again the Army was swell on cooperating. We went up to Bretton Woods, N. H., the night before the eclipse to get squared away on plans. At noon the sun was about half-covered and a low overcast swung in from the ocean and obscured nearly everything. We took off in an Army *Falcon* and climbed to 17,000 feet, perched high in the sky when the instant of totality came. Only a few holes in the clouds below were visible. We made steep spirals down after seeing all there was to see and landed with splitting ear drums. The results were perfect. All the other reporters in Maine and New Hampshire sat on the top of hills with all sorts of equipment and merely swapped stories.

(*Concluded on page* 93)

Make a Radio Compass for $10

by A. W. SMALL

This is for you fellows who think that, just because radio compasses are comparatively new, they are expensive. Now any plane owner can build and install one.

HERE is how you can build a radio compass for $10. When you build it, hook it on to any radio receiver. Put it in your airplane. Fly direct to any city you choose, simply by tuning in a radio broadcasting station from that city.

It's the latest Bureau of Standards and Army type. Only it has been simplified by using mechanical methods instead of electrical, for getting proper directional effect. And it's actually been improved thereby.

First, buy the following:

Six-volt toy motor (any speed).

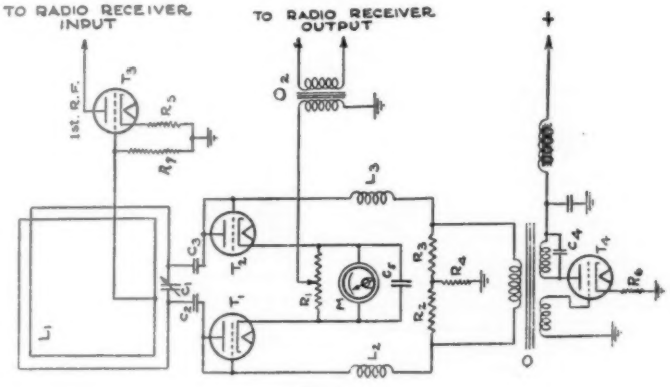


Figure 1

Fixed condensers, one of .001 microfarads capacity, two of .5 microfarad capacity. (The latter two may actually range from .5 to 100 mfds. The former may range from .001 to .05 capacity.)

One quarter megohm resistor or grid-leak.

One "carborundum fixed crystal detector."

One galvanometer sensitive enough to indicate one milliampere or less.

"You'll also need some wire and spools and odds and ends."

Before we throw these parts together, let's consider the theory.

The Bureau of Standards learned after long efforts that a grounded loop antenna receives best on the end not grounded. So that if a radio station not directly in front of it but to one side is tuned in, it'll be loud when the loop is grounded on the far side, and weak when it's grounded on the near side. The *difference* in volume will indicate how many degrees the radio station is to one side. If you can indicate this *difference* on a meter, you can know the instant you are flying toward that station because then there will be no difference indicated. When you fly to either side of the course, the meter will swing out correspondingly to either side.

That means then that the loop has to be grounded rapidly first on one side and then on the other.

It also means when the loop is grounded on one side, the meter has to be hooked in the circuit one way, and when the loop is grounded on the other side, the meter has to be hooked in the circuit reversed. Thus the current flows back and forth through the meter with great rapidity. When the current from both sides is equal, the meter stands still. That indicates "on course," as just explained in the paragraph above. When the current is greatest from one direction, it causes the meter to swing out in that direction to a corresponding degree. That is how the difference in currents is registered by a meter.

In order alternately to connect a ground to each end of a loop antenna, and switch the meter as explained, the Bureau of Standards employs electrical means, using an audio oscillator and rectifying tubes. Their diagram is shown in Figure 1. It's simple if you are a radio enthusiast, but if you aren't and you try to build it, you're likely to get lost.

The way we're going to do it is easily described. If the problem is merely one of switching, why not use actual switches? That's what we've done—used commutators and slip rings, and done our switching by having an electric motor drive them. Thus we have five "rings," all on a shaft turned by a toy six volt motor.

You can build them by shoving a spool on the toy motor shaft, and wrapping strips of copper around it in the places where the rings go. In the diagram (Figure 2) the rings are indicated by A, B, C, D, E, and F. Rings B, C, and F, are complete circles, and the brushes are always in contact with them. Brushes may be regular carbon brushes, or just copper strips fastened so as to rub against the rings as the rings turn.

Ring A is just a little less than half a circle. It is in contact first with one brush and then the other. Its size is not critical. It *could* actually be a little more than half a circle, but if it is just a fraction under it is best.

Rings D and E, both "in the same slot," so to speak, are each less than half

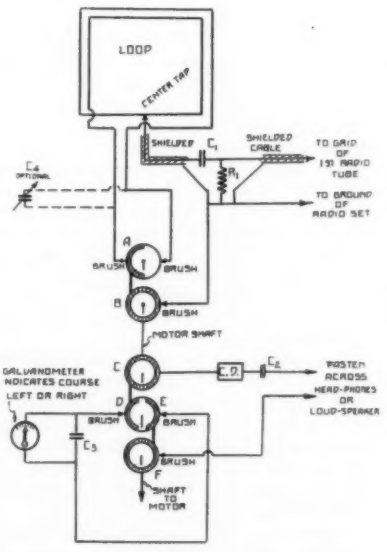


Figure 2

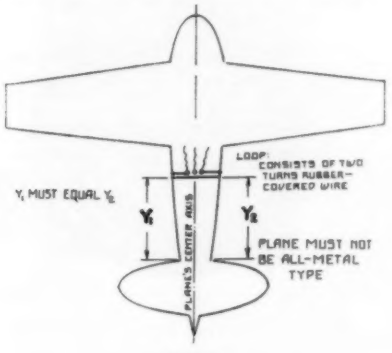


Figure 3

(*Continued from page 63*)

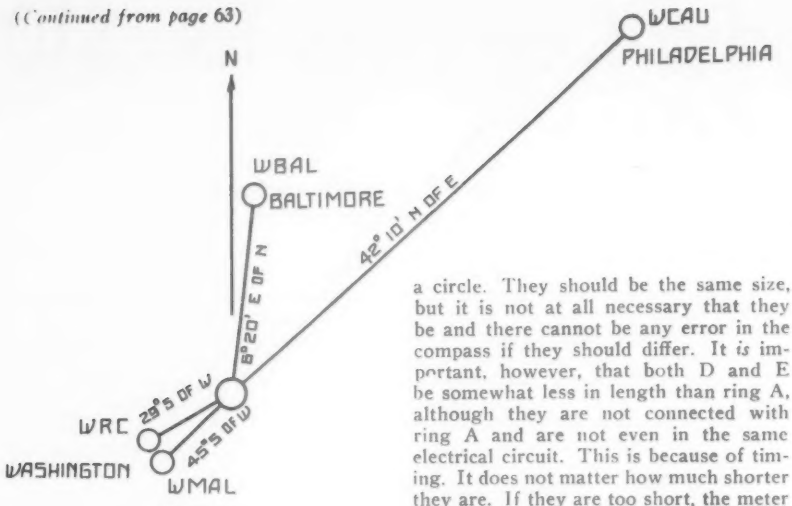
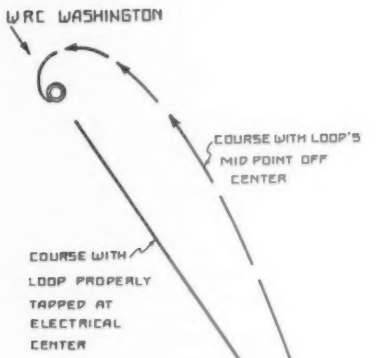
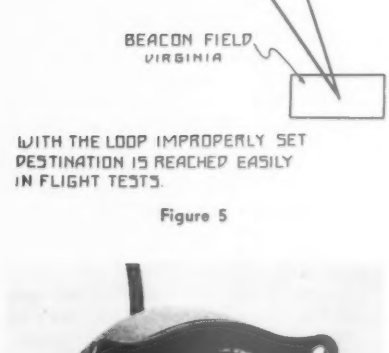


Figure 4


WRC WASHINGTON
COURSE WITH LOOP'S MID POINT OFF CENTER
COURSE WITH LOOP PROPERLY TAPPED AT ELECTRICAL CENTER
BEACON FIELD VIRGINIA

WITH THE LOOP IMPROPERLY SET DESTINATION IS REACHED EASILY IN FLIGHT TESTS.

Figure 5



Above is the face of a typical radio compass dial of the galvanometer type. This really is a converted milliameter.

a circle. They should be the same size, but it is not at all necessary that they be and there cannot be any error in the compass if they should differ. It *is* important, however, that both D and E be somewhat less in length than ring A, although they are not connected with ring A and are not even in the same electrical circuit. This is because of timing. It does not matter how much shorter they are. If they are too short, the meter reading will be weak. But if either is *longer* than ring A, there is a chance of error in the final compass direction reading.

Note that rings A and B are connected electrically, that rings C and D are connected electrically, and that rings E and F are connected electrically.

Condenser C1 is .005 microfarads, condenser C2 and C3 are each .5 microfarads. The carborundum detector is represented in the diagram by "C. D." It is absolutely necessary. It can be connected either way, though one way gives stronger readings, and reversing it neverses the direction of the meter. More on that later. Resistance R1 is a quarter megohm grid-leak.

The galvanometer can read anything, with the provision that the zero reading is in the center of the scale, and that it can deflect to either side depending on the direction of the current. See Figure 6 for the "dressed-up" dial, which can be installed by you if you want to go to the trouble of cutting a new dial out and jamming it in the case properly.

The two wires leading from the right hand side of the loop circuit go to the input side of the radio. One should be connected to the grid of the first radio tube in the receiver, and whatever is already connected to the grid should be removed. The grid is marked "G" on the tube socket, unless the tube has a "cap" at the top of it with a wire leading from the cap. That cap is the grid. Disconnect the wire and fasten this wire to it. Be certain that the shielded cable is connected to the ground of the radio set. That connection is indicated by the lower wires of the pair, marked "to ground of radio set." This is also the loop grounding wire.

The other two wires, leading from the meter circuit, are to be connected across the headphones while they are still in the circuit of the radio, or across the loudspeaker while it is still in the radio. They divert part of the broadcast signals to the meter in the manner previously described.

Condenser C4 is a tuning condenser to be used to tune the loop to make the signals louder, just in case your radio is so darned weak you can't hear much. Don't use condenser C4 unless necessary. It should have about 23 plates (.0005 mmfds. capacity), and when tuning in a station, see that this condenser is not tuned exactly to the station, but always with the moving plates just a little "out" from the stationary ones. If you have a good radio don't bother with this condenser. It isn't listed in the parts to buy.

It wouldn't hurt to hook the motor up to a battery through a switch, so that it can be turned on and off. The Bureau of Standards install a loop on the airplane.

A simple and improved type of loop is shown in Figure 3. Wrap two turns of wire around the fuselage, anywhere, just so the distance from the tail to the loop on the left side is equal to the distance on the right. The loop should be fastened by tacking it to the frame through the fabric. (If you have an all-metal ship, the loop can ***not*** be built on the fuselage but must be installed above or between the wings.)

Wires leading from the loop are three: the two end wires, which should be twisted together—that is, they are preferably a two-wire lamp cord of ordinary type—and the center-tap wire, which is shielded cable, grounded as described. With the wires so constructed, they may be run all around the plane, any length, from loop to compass, without destroying the directive effects of the loop. The shorter the path the better, however, and preferably they should not pass ignition cables, so as not to pick up spark interference. *(Note:* The loop's center tap should be located at the plane's central longitudinal axis, as shown, Figure 4.) Spark plug suppressors may be found necessary.

Let us now assume that everything has been built and is now properly installed, and we are about to try out the set-up for the first time. Spark plug suppressors have been installed, and there is no ignition noise. Here is how we begin operations:

With the toy motor switch off and the motor not running, tune in the desired radio station. If you can't hear it that's because there's something wrong with your radio.

However, do not expect distant stations in the day time, at least not until the plane is some ways up above the ground. If the radio is working all right but the signals are too weak, either get a stronger radio or else install tuning condenser C4, as explained earlier.

We will now assume that the station has been properly tuned in. Note the galvanometer—it shows a reading to one side or the other if the slip rings are in proper position. If it does not show a reading, casually spin the motor shaft a small amount with your finger until it does. If the reading is so small as to be negligible, it is because the galvanometer is not sensitive enough. The galvanometer should be able to respond to currents of one milliampere or less.

(*Concluded on page 87*)

Elements of Aerial Navigation

by RAOUL J. HOFFMAN

Herewith a simple, yet proper, treatment of the elementary principles of avigation and the basic mathematical equations used. The accompanying nomograph is useful.

FLYING to a point beyond the horizon and without previous knowledge of the territory can be done only with maps and instruments. The apparent "homing" instinct of a few pilots is nothing else than a great deal of experience and memory of cross-country and map-flying. They seldom use maps when flying a distance of 200 to 400 miles.

All cross-country flying depends on the mental and physical fitness of the pilot, the accuracy of the instruments and the simplicity of the maps. These three are main subjects of the science of avigation; avigation deals with the guiding of an airplane from a place to a point of destination and with the determination of its new location on the earth's surface. Dead-reckoning, a part of avigation, finds the new location of the airplane from the direction and distance it traveled from its original position without reference to any other object.

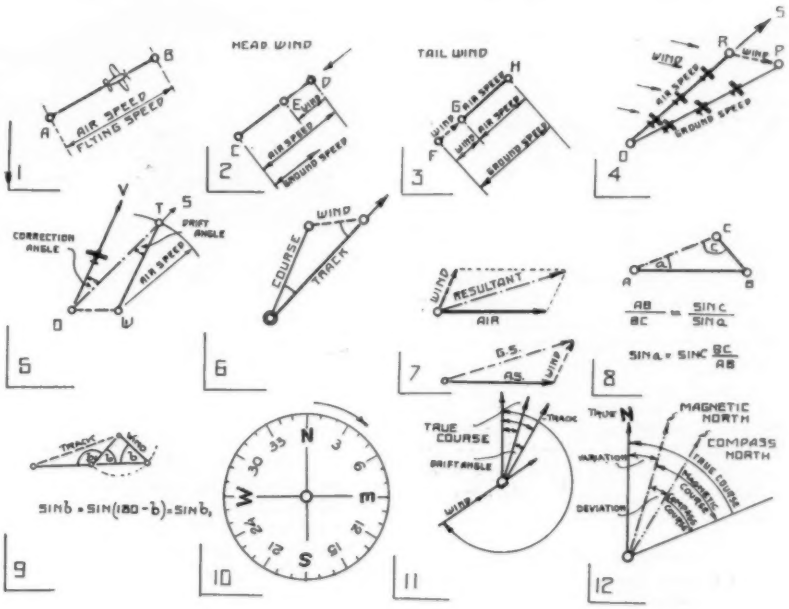
Dead-reckoning is simple if the air is dead calm and with a reliable airplane the machine will travel in the direction it is headed, as indicated in Sec. 1, flying from point A to point B. The heading is the direction lying through the fore-and-aft line of the airplane. The distance covered on the earth's surface or the ground speed will be equal to the flying speed. The flying speed is the speed of an airplane relative to the mass of air, called the air speed; the air speed is assumed to be independent of the wind speed.

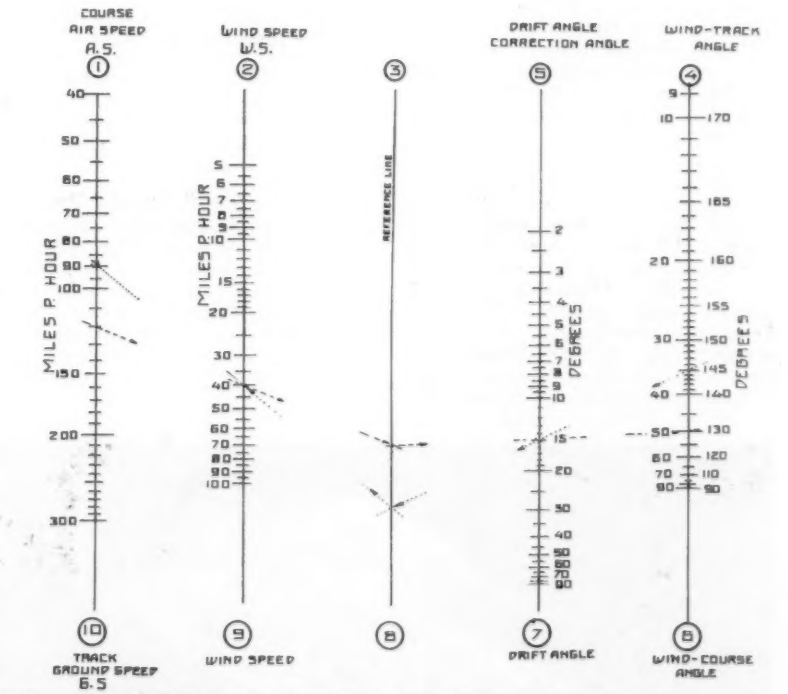
However, the problem gets more complicated if the air is in motion. If the wind blows opposite the direction of the airplane—viewed from the ground—the ground speed will be the air speed less the wind speed; a head wind is present (Sec. 2). If the wind is blowing in the same direction as the airplane is moving the ground speed will be the sum of the air speed and wind speed; a tail wind is present (Sec. 3).

This simple arithmetical procedure can not be applied to problems when side wind is blowing, as indicated in Sec. 4. The plane is heading in direction of O-S with a wind blowing from the left. As the air plane travels the wind is blowing it toward the right and after a certain time it will be at point P. This point P can be found by letting the airplane fly, without wind, to point R and then letting the wind blow it to point P, using the same time element; for simplicity use m.p.h., and any convenient scale. The new location is the position the plane drifted; assuming uniform speed the angle R-O-W is the drift angle and the line O-P the ground speed or the track.

The resulting ground speed so necessary for plotting may be constructed as shown in Sec. 5. The line of flight is

(*Concluded on page 70*)



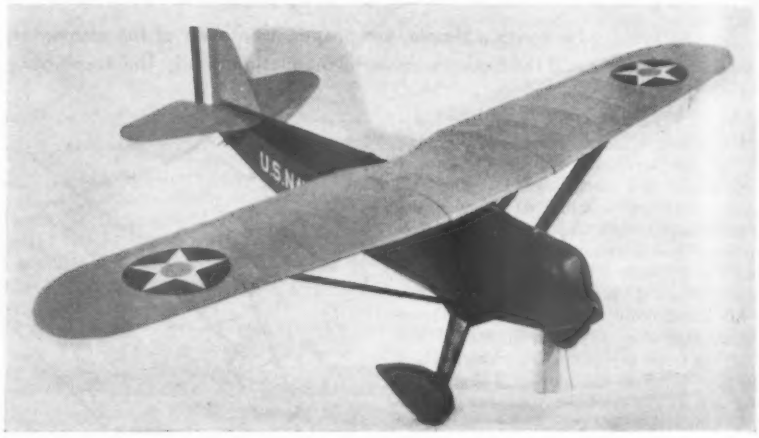


EXAMPLE: AIRSPEED 120 M.P.H., WIND SPEED 40 M.P.H. WIND-TO-TRACK ANGLE 130°, FIND GROUND SPEED AND DRIFT ANGLE. CONNECT 120 ON SCALE Nº1 WITH 40 ON SCALE Nº2 INTERSECTING LINE Nº3 CONNECT INTERSECTING POINT WITH 130 ON SCALE Nº4; THE LINE WILL CROSS 18, THE DRIFT ANGLE ON SCALE Nº5. SUBTRACT 130 AND 18 FROM 180, IS EQUAL TO 35 THE WIND-TO-COURSE ANGLE. CONNECT 35 ON SCALE Nº6 WITH 18 ON SCALE Nº7 AND INTERSECT LINE Nº8, THEN CONNECT THIS POINT WITH 40 ON SCALE Nº9 THE LINE WILL PASS THRU 90 ON SCALE Nº10 THE GROUND SPEED IN M.P.H.

Navy Racer as a Gas Model

by PAUL W. LINDBERG

POPULAR AVIATION Model Editor



Here is the finished model of the lightning-fast Navy racer that competed in the 1930 National Air Races at Chicago. This ship was a converted Curtiss "Hawk".

NEVER was there a more graceful and finished ship than the U. S. Navy racer shown here. This popular model is known to the far corners of the earth and has been built by thousands in the rubber-powered field.

We take great pride in presenting a gasoline-powered model of this popular ship to our model enthusiasts. It has turned in some remarkable flights as it possesses excellent gas model features. It is fairly simple to construct and can be built in a remarkably short time. By enlarging the plans five times, your model will be of the same size as that built by our laboratory. A slightly larger model may be had by enlarging the plans six times.

Construction of Fuselage

The main longerons are of basswood, all other parts are of balsa. Place wax paper over the plan to prevent the fuselage sides from sticking to the drawing. Please note that it is very important when cementing the two sides together that great care be taken so as not to crack the main longerons. One-half inch No. 18 nails are driven through the longerons into the uprights and cross members of the fuselage.

From one-eighth inch sheet balsa, cut the formers and cement them in their proper locations. The one-eighth inch by three-sixteenths inch stringers are attached and spaced evenly about the formers, as shown in the front and side view of plan. Three-sixteenths inch three-ply veneer firewall is attached to the front of the fuselage. Drive nails through veneer and into longerons so that it will hold fast. The motor mount is made from three-sixty-fourths inch one-half inch hard aluminum or one-thirty-second inch soft steel.

Photo of the framework clearly shows the pieces of body which are covered by thin cardboard and aluminum, one-eighth inch balsa ribs are attached to the top of the cabane struts (see side view of plan). The cabane struts are constructed from one-eightth inch spring tempered steel wire in order to give a great deal of strength at this point. These in turn are bound to the cross members in top of the fuselage. After all cross pieces have been inserted in top of cabane section, five-sixteenths inch drilled dowels are cemented in and bound with heavy thread. These are installed to receive shear pins which hold wings in position.

Construction of Landing Gear

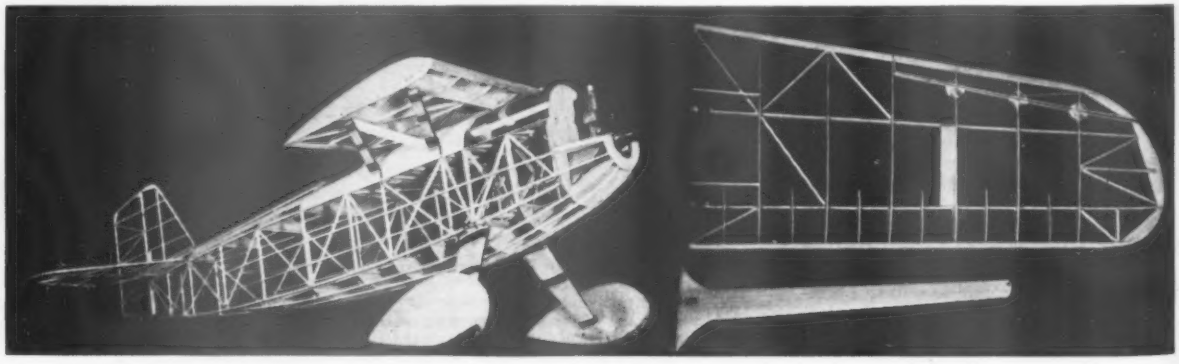
The type of landing gear used on this model is simple to construct. It consists of two pieces of one-eighth inch spring tempered steel wire. The front piece forms the axles for the wheels and continues up into the fuselage. The rear wire is bound to the front wire and continues up and across the bottom of fuselage.

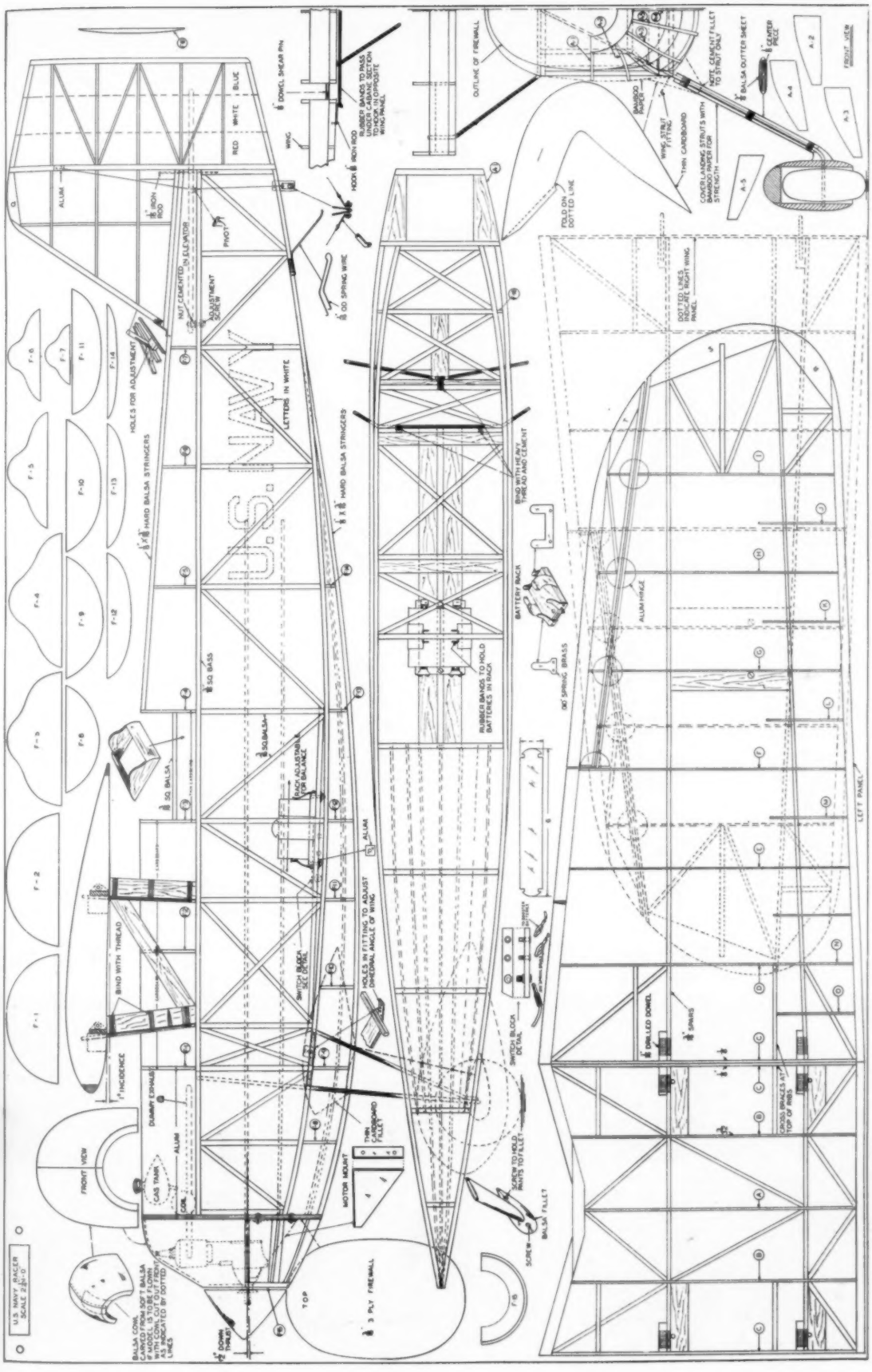
Fill in the space between the one-eighth inch landing gear rods with sheet balsa. A piece of one-eighth inch thick is used at the center with a piece of one-sixteenth inch balsa on either side so as to fill out the struts. After this has been completed bind struts with thread and cement, cover complete strut with bamboo paper. This will add to the strength. Fill in bottom of strut with balsa, where it connects with pants. A little patience is required here as this will have to be fitted and shaped in order to obtain a finished effect. The wheel pants are described on the plan and are used for display purposes only, do not fly model with wheel pants on.

Construction of Elevator and Rudder

The construction of the elevator and rudder is very simple as both are built to the front section, three-sixteenths inch in thickness. Construct upon a flat surface so that they will not have a tendency to warp. The elevator is adjustable by means of an adjustment screw located at the center of the leading edge. Lock nuts may be applied here

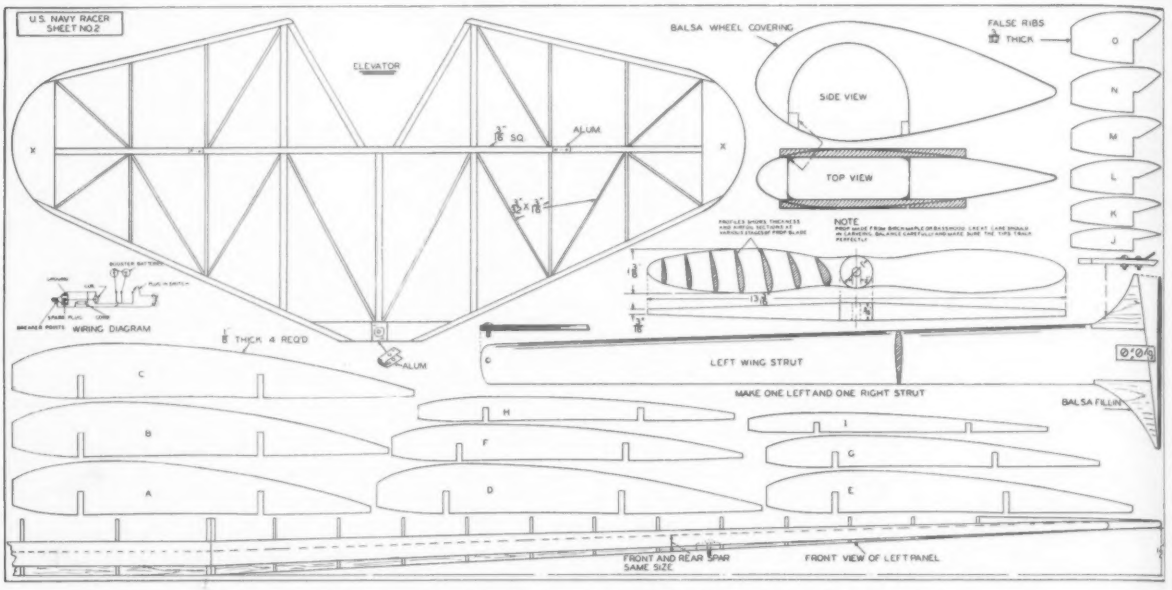
(*Concluded on page* 68)




U.S. NAVY RACER
SCALE 2 IN. = 1 FT.
FRONT VIEW
DUMMY CRYLED
INCIDENCE
BIND WITH THREAD
SQ BASS
SQ BALSA
HARD BALSA STRINGERS
HOLES FOR ADJUSTMENT
BUT CEMENTED IN ELEVATOR
ADJUSTMENT SCREW
PIVOT
ALUM
RED
WHITE
BLUE
LETTERS IN WHITE
IRON ROD
DOWEL SHEAR PIN
WING
HOOK
RUBBER BANDS TO PASS UNDER CABANE SECTION TO HOOK ON OPPOSITE WING PANEL
OUTLINE OF FIREWALL
BAMBOO PAPER
WING STRUT FITTING
THIN CARDBOARD
COVER LANDING STRUTS WITH BAMBOO PAPER FOR STREAMLINE
BALSA GUTTER SHEET
CENTER PIECE
NOTE CEMENT FILLET TO STRUT SALT
FOLD ON DOTTED LINE
DOTTED LINES INDICATE RIGHT WING PANEL
ALUM HINGE
BIND WITH FINE THREAD AND CEMENT
BATTERY RACK
RUBBER BANDS TO HOLD BATTERIES IN RACK
.010 SPRING BRASS
SWITCH BLOCK DETAIL
HOLES IN FITTING TO ADJUST DIHEDRAL ANGLE OF WING
MOTOR MOUNT
THIN CARDBOARD GUSSET
SCREW TO HOLD PARTS TO FILLET
BALSA FILLET
SCREW
3 PLY FIREWALL
TOP
DOWN THRUST
BALSA COWL CARVED FROM SOFT BALSA WITH HOLLOW OUTER SHELL 1/16 INCH THICK, CUT AS INDICATED BY DOTTED LINES
CAS TANK
COIL
ALUM
DRILLED DOWEL
SPARS
CROSS BRACES AT TOP OF RIBS
LEFT PANEL
F-1
F-2
F-3
F-4
F-5
F-6
F-7
F-8
F-9
F-10
F-11
F-12
F-13
F-14
A-1
A-2
A-3
A-4
A-5
FRONT VIEW

Building the Navy Racer Gas Model

(Continued from page 66)



This gas model has proved itself to be unusual in its flight characteristics. The design is simple and very rugged. Our model of this famed racer is peculiarly adapted to the model field.

after the proper setting is had. The rudder adjustment is very simple and is clearly explained in details found on the plans.

Construction of Wing Panels

All ribs are cut from three-thirty-second inch sheet balsa. Spars, leading and trailing edge then are cemented into place. Do not omit any of the bracing between the ribs, as this is necessary to strengthen them. Five-sixteenths inch dowels are cemented to spars at the root of wings. The wings carry moveable ailerons, which are a great help when flying the model, as a small amount of washin is necessary to counteract propeller torque.

The entire model is covered with a good grade of bamboo paper. In applying the paper to the framework, ordinary model airplane dope will not do. Ordinary cement, thinned out slightly, makes an excellent paper cement. In order to obtain a nice covering job, see that practically all wrinkles are removed.

Do not stretch the paper so tightly over the frame that it will have a tendency to pull out of shape. After the various parts have been covered, dope with water. This will cause the paper to tighten over the framework. If the brush is used, extra precautions should be taken so as not to tear paper.

Any small spraying device is an excellent means of applying the water. After the pieces have become thoroughly dry, clear dope them. To obtain a smooth finish, a light sanding is given between each coat. To finish off the model color coats are applied. Color used in this model is blue fuselage with yellow wings.

Incidentally, this department would like to hear from POPULAR AVIATION model fans who have been building these models lately. We plan, in the near future, to extend ourselves a bit in this department and turn out something unusual in the model field. This will be in keeping with the general revamping of the present POPULAR AVIATION.

If any of our readers have some ideas along these lines, drop us a line. What do you think would be an unusual model to experiment with? You fellows out there can help this department a great deal. (The editors have been passing on their ideas—which goes to show what editors know about designing flying gas models). Anyhow, let's hear from you soon.

END

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BLUE!

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COUNT THE CUBS

THE WORLD'S FASTEST SELLING AIRPLANE

We Need a Law

(*Continued from page 32*)

In many foreign countries civil aviation is subsidized to keep it a part of the national defense. In this country the connection is much more remote. Nevertheless, every civil airport will be available for military use in time of war. Such airports, when taken over by the Air Corps will be closely guarded, cameras will be forbidden and even the public excluded, if the outfit using the field is a tactical one, part of the General Headquarters Air Force. The job of keeping prying eyes and cameras away from the machines and equipment on many of the fields looks as if it will be well-nigh impossible. Too many private dwellings and public structures overlook these fields. No doubt the military authorities have planned how to cope with such a situation when it arises, but wise zoning laws now will help them and all of us should war be brought to this country. Several years ago the writer, visiting Europe, was struck with the apparent lack of military airports. It must therefore be assumed that they are out in the country, far enough away from the centers of population so that the presence of civilians near them can easily be controlled. It is true there were a number of dwellings near some of the civil airports, but the occupant of one such private dwelling remarked that he knew that air force officers would be billeted there in time of war.

There is little time to waste. A building boom such as may be in the offing will result in many new houses and accompanying wire lines being built around existing airport areas. A pick-up in industry will see new smoke stacks poking themselves into the air needed by airplanes landing and taking off from some field. A wise zoning law may prevent such a situation; and it appears more practicable first to enact such zoning laws; then go after those dealing with condemnation of existing obstructions. Failure to act to improve an airport may cause an airline to refuse to use a field serving a city. Or the Bureau of Air Commerce may declare a field too dangerous for scheduled airline operations therefrom. The alternative may be to acquire a new site farther from the center of population, with no building facilities, and probably with almost as many obstructions to the airliners of five years hence as is offered by the present site to planes of the present. The airport at Washington, D. C., is probably this country's "horrible example."

The writer is not too optimistic. He can foresee many legal and extra-legal obstacles placed in the way of a bill enacted to remove physical obstacles from around the peoples' flying fields. Brightly-painted markers, and obstruction lights for night flying are only temporary expedients. Many good private pilots dislike risking their necks and their own airplanes in night cross-country flights which would necessitate their landing at "foreign" airports, even though these ports have lighting facilities.

Readers familiar with the environs of Mitchel Field on Long Island near New York City may remember the time when it was a sandy plain. This is the area described by Major Hugh C. Downey in his articles on early flying at Hempstead Plains. Came the World War and a flying field, several of them, in fact. Then for some years after the War the landing area of Mitchel Field was adequate for the purpose. DeH's flew in and out of the field with safety. Curtiss O-1's and Douglas O-2's came later. They were O.K., but pilots noticed the encroaching homes being built on the outskirts of the field during the 1926-1929 boom. Then recently came the big planes to Mitchel Field when it was made a bombardment base; the B-10's and bigger B-18's.

EXTRACTS FROM BUREAU OF AIR COMMERCE AIRWAYS BULLETIN NO. 2

"Descriptions of Airports and Landing Fields in the U. S."

(Extracted from bulletin,—page chosen at random)

(Ten airports described on page)

A***N.—buildings to N., 85 foot tower on SW. end . . .

A******E.—Trees to N., E., and SW.; pole lines on W. and SE.; building to SW.; factory to S.

A******E.—pole line to S., trees to NW.

A******D.—Pole line to N., trees to SE. and E.; radio towers to NW.; house to NW., windmill 40 feet high 400 feet SSW. of field, unlighted.

A*****D.—Pole line to W.

A*******A.—pole lines to W. and NW.

A****S.—Pole lines to N. and S.

B*******N.—Low pole lines to N. and E.; trees one-half mile SW. of field.

B*****D.—building on N., low woods to SE.; ore dock to SW.

B*****S.—Pole lines to N.; trees and buildings to S.

Something had to be done. The War Department did it; getting authority and funds to acquire more land around the field so operations would be safe for some years to come. That is an example of planning for the future.

How many states, cities and populous counties have so planned, and have an intelligent aviation program. How many planning commissions include planning for the increasing needs of air commerce among their objectives?

As far as the writer can determine, the answer is,—"not many." If you have; let's hear what has been done, and how. The aerially backward communities may get some good pointers.

END

Avigation

(*Continued from page 65*)

drawn from O to S; then the wind direction and its speed is marked from O to W. From point W an arc with a radius of the air speed is drawn, intersecting the line O-S at T; then the distance O-T is the ground speed, the track made good by the airplane and the angle O-T-W is the drift angle. A line O-V drawn parallel to W-T through O gives the heading of the airplane; the angle V-O-T is the correction angle, congruent with the drift angle.

The three velocities, the course, the track and the wind speed, form the wind triangle, shown in Sec. 6.

At the beginning of a flight usually the wind speed and the air speed is given, and the drift angle and the ground speed to be determined. The two speeds can be represented by a vector, which is a straight line with an arrow indicating the direction and the length representing its speed. The resulting speed is the geometric sum found by the parallelogram shown in the upper part of Sec. 7. This parallelogram is nothing else than the previously mentioned wind triangle.

The graphical solution can be replaced by trigonometric function of plane triangles; three parts must be known that a solution may be possible.

The fundamental formula is the law of sines; its equation is noted in Sec. 8, from which one angle, the drift angle or one side, the ground speed is determined. Sec. 9 shows that the sine for b and bl is the same and to eliminate an error a sketch of the problem will be necessary.

All angles are measured from the true north. The true north is the direction of the geographic longitudinal lines, the true meridians. The angles are measured clockwise and counting, for the full circle, 360 degrees (Sec. 10). The course and the track are measured facing with the direction, the wind is given with the point it blows from, as shown in Sec. 11.

The instrument generally used for reading the course is the compass, which indicates the magnetic north. The magnetic north is seldom the true north and the difference, called variation, is noted on maps.

Interference from various sources and mechanical shortcomings is the cause of compass errors, called deviation. A deviation card should accompany each compass giving a reading every five degrees.

The results of dead-reckoning are plotted on a geographical map and therefore all compass readings must be translated into angles from true north. Sec. 12 indicates the three readings: the true course, the magnetic course, and the compass course. A ready transposition from magnetic to true course, and from true course to magnetic course must be done.

The above mentioned sine-law for solving one main problem of the wind triangle was used in constructing accompanying nomograph. An example shown will readily explain its use for finding the drift angle and the ground speed.

END

I know no better start for a *career* in aviation than Boeing School training

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(Test Pilot and Vice Pres. Bennett Aircraft Corp.)

Ground and Pilot courses at this famous school meet the industry's requirements for better trained *men—young men who can continue to take on new responsibilities*

IT'S NOT HARD to see why aviation leaders regard Boeing School graduates so highly. Can you imagine any school better qualified to prepare you than *one that's part of the air industry itself?*

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• • •

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GRADUATION and PLACEMENT RECORD
(January—December 1937)

Months	Number Graduated	Number Placements	No. Co.'s Employing Graduates
1937			
Jan. . . .	10	12	6
Feb. . . .	4	13	7
Mar. . . .	33	21	11
Apr. . . .	8	16	6
May . . .	1	16	6
June . . .	34	14	8
July . . .	5	7	2
Aug. . . .	4	2	2
Sept. . . .	20	17	7
Oct. . . .	4	3	2
Nov. . . .	2	2	2
Dec. . . .	29	7	3
TOTAL . .	154	130	26

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Courses requiring 2 yrs. pre-eng.:
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- ☐ Practical Aeronautical Engineering
- ☐ Airline Flight Officer

Courses for engineering graduates only:
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Courses requiring special training:
- ☐ Special Airline Pilot
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NOTE: Link Trainer Instruction available to students in all courses.

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Name _____

Address _____

City _____

State _____ *Age* _____

Tadpole Clipper

(*Continued from page* 15)

tremendous financial loss to the manufacturer, or, at least, necessitate costly changes in the completed airplane.

Naturally, if a manufacturer could be reasonably sure in advance that his new model would be a success, he would be more inclined to go ahead with its construction. On the other hand, the price of failure would be so prohibitive that, with the old methods of original research, he is not so inclined to take the risk.

Martin hopes that the flying model built to the exact scale of the projected airplane will enable him to determine much of the data necessary for its construction, by testing it under *natural* conditions to eliminate as much design error as it is humanly possible to eliminate, and enable him to make any necessary changes before construction begins.

"Tests on this model," a company official said, "will determine the feasibility of design features, and their adaptability to large flying boats, either commercial or military."

It has a gull wing slightly in excess of 40 feet in span, projecting out from a stubby hull that resembles closely the big flying boat which Martin has just completed for Soviet Russia, the Martin Ocean Transport. Like the Ocean Transport, its hull sweeps up in a graceful curve at the stern where a long flipper and a double rudder are mounted.

When the engineering section obtained Mr. Martin's approval and went ahead with the construction of the little ship (which carries two men), they encountered several problems arising from its small size and the necessity for building it to scale. They wanted two propellers, but could not find radial engines small enough to be in proportion to the remainder of the ship. To get around that, they finally took a four-cylinder, air-cooled engine, designed and built by Martin about seven years ago, and installed it in the hull immediately behind the pilot's compartment.

A series of belts operating through a master pulley run up into the wings, driving two stubby little propellers which are mounted in front of dummy nacelles built to the proper scale. The idea worked, and the Martin engine drives the ship at a top speed of about 120 m.p.h.

It has been flown successfully now for several weeks, to the satisfaction of Mr. Martin and his engineers, who believe that by combining the results of its tests with those in the wind tunnel and towing basin, they will be able to go ahead with the full-sized airplane without fear of expensive alterations or errors.

One of the most important of the tests being conducted with the little ship is to determine its characteristics on the water. Naturally, a flying boat must handle well when it is being maneuvered on the surface, and the shape and dimensions of the hull are of the utmost importance.

When Ken Ebel, Martin's chief test pilot, flew the Russian transport for the first time, he slammed it around on the water in a manner that brought gasps from the small party of engineers and newspapermen who were watching from a speedboat.

But, although he handled the big airplane as if it had been a speedboat itself, back of him he had the lessons learned from testing the Pan American Clippers, of which the Russian ship is merely an improved version on a larger scale, and confidence in its strength and maneuverability derived from the same source.

"Golly, flying weather's zero-zero."

Such tests would be highly dangerous, from the financial standpoint, with a completely new, untried model. It would be necessary as a business venture that the builder know in advance just exactly how the hull should be built.

Obviously Martin, who is a careful, conscientious engineer despite his vision, wants to know definitely that all parts of any airplane he builds will withstand abnormal stresses and strains. At the same time, the cost of failure of any part of a huge flying boat of the type he is now building would be so great that such failure would be a serious financial blow to Martin or any other manufacturer.

There is the beauty of the little flying model. Ebel can take it out on the water, in rough weather or on a day when the Chesapeake Bay is like glass, and give it as rough treatment as the Martin engineers think is necessary. If a pontoon gave way, it could be replaced with a better one at a comparatively low cost, and the design fault that caused the failure could be remedied before the big ship ever reached the production line.

The Martin scale model is, as far as any one knows, the first of its type in the world, as was stated before. No one, to the Martin company's knowledge, ever before has attempted this method of development.

Before the Short Brothers laid down the keels of the 29 "Empire" type flying boats which they are building for Imperial Airways, certain helpful data was accumulated by a somewhat similar method on a more confined scale. The British firm took a sport airplane and modified it so that in certain respects its performance would duplicate what they believed would be the performance of the actual flying boat. The tests, they said, were successful, but in the end, it is understood, they relied principally upon the results of wind tunnel and towing basin tests.

Undoubtedly the Short organization will adopt the Martin scale model method if it is successful, since they are one of the oldest manufacturers of flying boats in the world, and have always used the very latest methods of development.

Only when Martin has actually built a huge superliner larger than anything ever before constructed, using the scale model to help work out the characteristics and performance, and it is as successful as all his other airplanes have been, will the true value of the little experimental ship be known. Only then will anyone know definitely that the idea is the answer to the manufacturers' problems. If it is, we all may be sure that the world will see some amazing advances in the construction of big flying boats of the type which will rival the surface ocean-going craft of today; the kind that has been predicted in the Sunday "science" section, but so far not seen.

There is no doubt, though, that the Sunday "science" section airplane is rapidly turnng out to be *the* modern airliner. That is, with a few exceptions; there is a limit to the stuff used along those lines by certain newspapers. Nonetheless, the flying wing was once (and still is, to some extent) thought to be a pipe dream. But far-sighted manufacturers like Martin have other ideas on that sbuject. Martin's "Tadpole Clipper" is a fairly conclusive answer to that "fallacy."

END

The Birdmen's Perch

We want all birdmen, and future birdmen to feel welcome to light on this page whenever they feel like scribbling us a line or two. We get a great kick out of passing your stories along to others. But we can't print anything you say unless you remember to give us permission in your letters. Include permission next time, won't you?

MAJOR AL WILLIAMS, alias "Tattered Wing-Tips," Mgr., Gulf Aviation Dept., Gulf Aviation Products, Gulf Bldg., Pittsburgh, Pa.

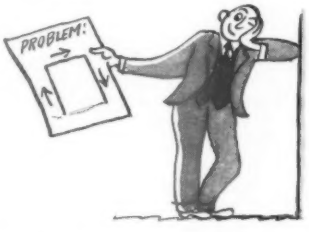
PENN. CENTRAL AIRLINES CHOOSE GULF AIRLINE OIL

The Pennsylvania Central Airlines, crack eastern transport company operating between Washington, Buffalo, Detroit and Milwaukee, are now feeding their planes 100% Gulf Products—having just recently added a contract for Gulf Airline Oil to their existing Gulf Gasoline contract!

Gulf Airline Oil is blood-brother in quality to the famous Gulfpride Oil used in private planes and fine motor cars. Both are super-refined by the patented Alchlor Process—the process by which Gulf takes premium grade, 100% Pennsylvania Oil, and then proceeds to even further refine it—yanking out as much as one-fifth *more* sludge and waste.

MORE BUGHOUSE NAVIGATION

Tattered Wing-Tips feels a little silly about this. But so many readers asked for another brain-teaser, just blame it on them. Here goes:



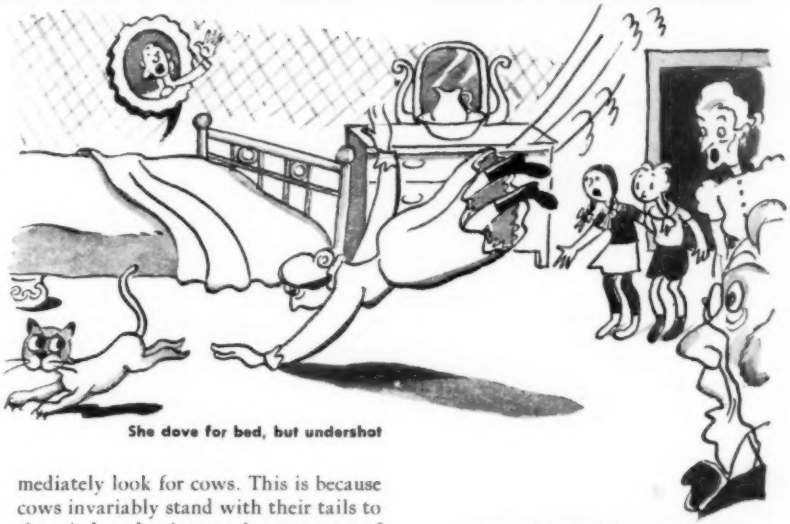
A plane with a speed of 100 m. p. h. travels due north for 100 miles. It then turns and travels due east 100 miles. Again it turns, and travels due south 100 miles. There is no wind at any point in the trip, but the plane found itself back exactly where it started.

How could this happen?

(You'll be mad as a hornet when we give you the answer. But drop us a line anyway, if you'd like to know it. P.S. Don't forget permission to reprint your name—**T. W-T.**)

MODERATE, WESTERLY MOOS

"*Dear Al:* A pal of mine from the Argentine claims that birdmen in his country have developed a lot more resourcefulness than we have. He says, 'When flyers down there encounter engine failure, they immediately look for cows. This is because cows invariably stand with their tails to the wind, and aviators who are aware of this fact have found it of immeasurable assistance in forced landings'."—**L. C.**



She dove for bed, but undershot

SHORT STORY

(*December 6, 1937*) "*Dear Mr. Wing-Tips:* I'd like to know the answer to the little problem appearing in Birdmen's Perch . . . concerning the birdman, the church steeple and the balloon.

"According to my figuring . . . it's impossible to find the speed of the wind with what is given. I had my college math prof verify this, so don't argue."

—**Charles T.**

(*December 22, 1937*) "*Dear Mr. Wing-Tips:* Thanks very much for the solution to the problem appearing in Birdmen's Perch. I now have the privilege of showing my professor where he was in error."

—**Charles T.**

Frankly, when Tattered Wing-Tips started that toy balloon over the steeple, he had no idea how many birdmen would take pot shots at it. We want to thank, for their interest, Messrs. A. Muhs, C. S. Roberts, Ralph Hester, Wm. Allen, C. Tracy, V. U. Young, Hayes Armbrust, Joseph Hogan, R. H. Freed, W. B. Henderson, V. H. Anderson, E. McDivitt . . . and a whole horde of others who forgot to give us permission to mention their names.—**T. W-T.**

THIS MONTH'S WHOPPER

It's gospel truth, and here it is:
The story of grandma's rheumatiz.
The doctor said, on mercy bent,
"Rub 'er joints with linament!"
We greased her joints, her fins and rudder
(And through grandma there ran a shudder).
She shook and groaned, and off she hopped!
Away she zoomed! Before she stopped
She looped around the chandelier
And hedge-hopped over the chiffonier.
"Whoopee!" she chirped, then lost her speed
(We gasped in fright at what we seed!)
She dove for bed, but undershot
(And china broke all o'er the lot!)
She scrambled out a-spittin' fire—
Seemed like her flight had riled her ire—
"Rheumatics gone, Hoo-Ray!" croaked she,
What kind of lin'ment can that be?"

We smelled of the bottle—you've guessed it, Alas!
We had rubbed her with GULF AVIATION GAS!

—**Dorothy Tibert**
Aroostook Flying Service, Turner, Me.

Gulf Oil Corporation and Gulf Refining Company . . . makers of

GULF **GULF AVIATION PRODUCTS**

Aviation in the Philippine Islands

(*Continued from page 34*)

fidence of the Filipino public. At the present time the company is carrying on an average of a little over 2,000 passengers per month on their various runs to the southern Philippines. The route flown by the Iloilo-Negros Air Express Company is over what is probably one of the wildest and most primitive air routes in the world.

Many of the small and little known islands of the Philippine archipelago are inhabited by primitive and savage tribes of Moro head-hunters who seem to obtain a great deal of satisfaction from hanging the head of a Christian or a white man upon the walls of their homes. But, with the record of safety that has been achieved, the pilots and passengers who fly this line never give a thought as to what the consequences of a forced landing might mean to them.

A short time ago, the line extended their services to Del Monte and Davao in Mindanao, thus completely linking the chain of islands south of Luzon with Manila. It is contemplated to meet the Dutch K.L.M. line in Zamboanga. If this plan materializes it will be possible to transport passengers, mail, and express to the principal cities in Europe in less than one week and to New York in less than two weeks. The Filipino government is formulating plans to help bring this about in as short a time as is possible, and it is believed than within a short time this line will be the link needed to establish a permanent chain from the Philippines to the nations of Europe and the Americas.

A branch of aviation that is vitally necessary to any country working toward the development of its aeronautical industry, is the flying school for training young students to take their place in this ever-expanding business. This need is well fulfilled in the Philippines by the American Far Eastern School of Aeronautics, and the Valeriano Aviation College.

The American Far Eastern School of Aeronautics first had its conception in 1935. It got its start by two men who were able to see and plan far enough ahead to realize that the Philippine Islands would soon be needing a school of this type. These men were William H. Pratt, president and director of the school, and Raoul Messier, formerly of the United States Army Air Corps. Soon after the school was organized, it was given government recognition for their ground school, and at that time was the only government recognized aviation school in the Philippine Islands. The strict principals of this school require that all equipment and planes pass the Bureau of Aeronautics tests before being accepted for use in this up to date school. Since the time that this school was first organized it has served the aviation students of the Philippines with a degree of safety and reliability that is comparable to any of our recognized schools in the United States, and at the rate of success that this school is progressing it will continue to do so for a long time to come.

The aviation department of the Valeriano Automotive and Aviation College, Inc., was founded in June of 1934 in response to a great demand for an equipped institution of its kind. During the first year of its existence it had an enrollment of 25 students, and since then the number of students attending this remarkable school has increased with astonishing rapidity for a school located in a country that has known aviation for such a short time.

With the start of this school, the faculty made it a point to select only the best instructors obtainable. They were all graduates from abroad who hold high distinction in their separate lines of endeavor. Since the founding of the school there has been a notable increase in interest in aviation and much of this interest is primarily due to the extensive work that the Valeriano College has undertaken.

As an example of the progress of aviation in the Islands, in 1931 there were only a few students taking regular instruction. At the present time there are 252 registered students, 74 licensed pilots and 72 licensed mechanics in these Islands. When the Philippine Islands took over its own government, it immediately organized a Bureau of Aeronautics, placing Major Harvey W. Prosser at the head of this Bureau, and Dr. G. Y. Zara as Assistant Chief of the Bureau, and as Chief Engineer.

At the present time, the Aeronautics Bureau is extending all of its facilities to the development of airports, landing fields and other navigation facilities with an allotment of 200,000 pesos that are under their control for this work.

The Air Corps of the Philippine Army, under the supervision of Lt. W. L. Lee of the U. S. Army Air Corps, is in the process of organization and it is expected that many Filipinos will be trained as flyers for taking over the various positions that will need filling in the near future.

Many young air-minded Filipinos, however, have come to the States for flight training during the past few years. Some have returned to the Islands as pilots and instructors.

Within a short time, Manila is expected to become the hub terminal of several international airlines as soon as a definite government aviation policy is established. With the operations of the Pan American Airways, flying regular schedules between the United States, the Philippines and China, and with the Royal Dutch Air Lines now negotiating to operate from the Philippines to the Dutch East Indies and to Europe, it can be readily seen that aviation is developing very rapidly and that within a short time the city of Manila will be the recognized aeronautical center of the Far East. Suitable equipment for over-water flying in the Orient is now available in a highly developed form which can soon be manned by trained personnel.

Lastly, it should not be forgotten that the development of aviation in this country is not only essential to modern business communications, but also to the national defense policy where aviation will undoubtedly play a major part. The more pilots, airplanes, landing fields and navigational facilities that are acquired, the stronger the air defense will be as all persons and equipment dedicated to civil aerial activities are reserved materials for the Commonwealth Air Corps of the Philippines.

END

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AMERICA'S FINEST LOW PRICED AIRPLANES

The Zeppelin Is Coming Back

(*Continued from page 35*)

which will make for still greater safety, were arranged by the various trans-oceanic services, working cooperatively. Up to this time all over-ocean flyers had to depend on weather reports from ocean liners and shore stations—and their own uncanny weather senses—for routine information.

The newest sky queen was near completion when the *Hindenburg* came down in flames. It had been planned to place her in service this summer. The tragic end of the *Hindenburg*, the grounding of the *Graf* and the subsequent efforts to obtain American helium, caused work on it to be suspended temporarily. Certain structural changes were necessary also to prepare the ship for operation with helium instead of hydrogen. The keel was laid and the ship will be christened in the huge Zeppelin hangar in Friedrichshafen.

The Deutsche Zeppelin Reederei, the company that designed and is building the new airship (and the manufacturing company as well of the whole long line of Zeppelins) and the American agent, the American Zeppelin Transport Corporation, are undaunted by the possible competition in the trans-oceanic field to be offered by regular trans-Atlantic clipper ship flying. Even more Zeppelins, with increased passenger space, are planned for construction and operation.

Zeppelin operators say that the airship, though considerably slower than the airplane in flying speed, embodies so many more phases of personal comfort and is able to operate under so many conditions of weather that keep heavier-than-air craft on the ground, that the competition will not be ruinous.

They point out further that, in elapsed time, a Zeppelin with a non-stop flight from the United States to Europe, will be able to compare its schedules favorably with those of heavier-than-air ships, which make several stops on each crossing.

Not only do Dr. Eckener and Captain Pruss expect to be aboard the new ship when it makes its maiden flight, but other veterans, officers and crew, of the *Hindenburg* and other airships, hope to be at their usual stations when the new air giant takes off from Friedrichshafen.

With these men airship navigation is the one thing of real importance in the world, and there exists between them and the airship men of other nations a strong and peculiar bond of fellowship.

Hardly had the officers and crew of the *Hindenburg* been released from the investigation at Lakehurst before they were bound home, eager to aid in finishing the LZ-130 and to take their places aboard it. Theirs was the confidence born of many years of service in zeppelins.

The new airship is structurally almost an identical twin of the *Hindenburg*, except for slight changes necessary to helium operations. Since helium gas lifts only 92 per cent of the load that can be lifted by an equal amount of hydrogen, the loss of 8 per cent in lift was compensated by removal of excess weight in the new ship.

Zeppelin men report that, far from destroying public confidence in airships, the destruction of the *Hindenburg* acted as the greatest impetus yet known to the development of lighter-than-air navigation.

In America, where lighter-than-air work was at a virtual standstill, the public, though shocked by the loss of the *Hindenburg*, gained a greater understanding and appreciation of the technical problems of lighter-than-air travel because of the disaster and the subsequent discussions in the public press.

The builders like to think of their new LZ-130 as a monument to man's determination, courage and skill. It may well be called that. Railroad wrecks, losses at sea, airplane and airship crashes have never deterred man from forging ahead in his conquest of the elements and his battering at the barriers of time and space.

END

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Swanee Taylor

(*Continued from page 42*)

ington promptly wrote back directing that Franklin send one of the flyers over for America to see. But the aeronauts were already encountering too much trouble from the peasantry at home (who jumped on the balloons with pitchforks when and wherever they landed), to even consider coming to this "uncivilized" country. However, with much persuasion, Franklin prevailed upon Blanchard to agree to the trip on the proviso that our government guarantee his safety—in writing. Which is exactly what President Washington did. The letter began with, *"This is a licence to fly . . ."* etc., etc.

Happily, there is a small group of Philadelphians who are bound and determined that the memory of this historical event will not fade. For the past several years this group, headed by Wm. H. Kingsley, president of the Penn Mutual Life—whose home office stands on the site of the old British prison yard at 6th and Walnut—has been holding commemorative exercises on the roof of the building. Your devoted correspondent is proud to report that he was on the job for you this year, and that everything went off splendidly. The Aero Club of Pennsylvania joined with Mr. Kingsley's forces to conduct the ceremonies. Which consisted of sending up a scale model of the original balloon with a convoy of hundreds of gayly colored little toy balloons. It was very impressive, although Commander "Rosey" Rosendahl, U. S. N., did look sort of funny holding a bunch of toy balloons before the big one got under way.

Five years from now, in 1943, the sesqui-centennial celebration of the event will take place. Great things are planned, and I, for one, hope and pray that this country will become fully conscious of when and how flying did start in America. It is very fit and appropriate that George Washington should be both the Father of the Country as well as aviation's first patron.

Result of Determination . . .

There can be no doubt about it that a concerted protest on the part of the private and independent flyers has brought a Washingtonian reaction against the horrible misrule of the Bureau of Air Commerce. And it just goes to prove that the will of the people carries more impact and weight in Congress than all the lobbies put together. Already a movement is afoot to legislate the B. A. C. out of existence and surplant it with a Civil Aeronautics Board, accountable only to the President. For this we can thank such determined people as Yale Smith's Private Flyers Assn., out in the Northwest, Karl King's like organization in Utah and the hundreds of individuals who sat down and wrote to "Doc" Congress. I know this to be true, for Congressman "Mel" Maas (Minn. R), aviation's able and ardent champion, told me so at the above-mentioned anniversary party, in Philadelphia.

So, to repeat, sing out whenever you have anything to say. And remember that your congressman is first of all your friend; also, he isn't nearly as dumb as the wags and Broadway wits would have you believe.

A Lotta Scud . . .

Whenever a new Operations Officer takes office at Mitchel Field it seems that he simply *must* develop a mad-on at the pilots flying from Roosevelt Field. We can't go near their national rest camp (or hallowed polo patches), yet they whizz around over our playgrounds in surly disregard of the taxpayers and our right to use the air. Maybe they are already at war—against American citizenship. (Hope it isn't the same at other Army Fields.) . . . Again it is my happy privilege of recommending *"Flying for 1938"* to you for your son or the kid brother. It is, as usual, compiled by Howard Mingos and the last chapter on "Federal Government Activities," is thrilling stuff for man or boy. . . . Don't get too excited about Slim Lindbergh having ten detectives to guard him at the Wright Honors dinner. He knew he was among friends, but the hotel management went a little hysterical. Hence all the house dicks hanging around.

Commander Rosendahl has drawn up a proposed U. S. Airship Policy which makes a lot of sense. He recommends that we spend a few years and a little money to find out exactly what dirigibles will do. But I disagree with his views on commercial airship development. Keep the plan strictly experimental and 100 per cent American Navy. . . . Lock Haven, Penn., is the flyingest town in the U. S., so they say. There are 110 licensed pilots in the city, which figures out to be roughly one pilot for every 88.18 people in the city. Any disputes? . . . A news release tells us that The Aero Club of Pennsylvania announces the receipt of a $2,500 trust fund to be known as the "Hollinshead N. Taylor Memorial." The annual income will be awarded to a boy between 18 and 22 years residing within 40 miles of City Hall, Philadelphia, to assist him in obtaining flight instruction, ground school work or blind flying. This award, made by Mrs. Mary Stockton Taylor Brown, is in memory of a grand early aviation enthusiast and patron. Would to heaven that more estates of our early sponsors would similarly carry the deceased's love of flying beyond the grave.

END

Amateurs!

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Parachute Man

(*Continued from page 26*)

must be prepared for plenty of hard knocks."

Moore also exploded the old theory that one must count five before pulling the cord of a 'chute.

"Anyone who is about to jump has too many things to think about to even attempt to count five," he said. "If you're at only 500-foot altitude, that would be counting about four too many, anyway."

He explained that jumping is really all a state of mind. "If you're frightened to death you might even freeze to the harness through fear. That's been known to have been done," he said.

Moore's own most narrow escape was just a few weeks ago at Hamilton, Ohio, when he had fallen about 4,000 feet in a delayed jump and pulled the ripcord.

"When I looked back I saw soot falling behind me and knew my 'chute was burning," he said. "So I hastily pulled my other 'chute."

Personally Moore doesn't like batwing parachutes although he is obliged to test many of them.

He says that sometimes a parachute with a batwing can not only steer himself through the air, but can also climb a little and sometimes even perform a loop.

He admits that he was plenty afraid himself when he stepped off a plane the first time and Shirley Rainer, his pilot and instructor, said, "All right, Len, get out."

"Afterwards I wondered why the devil I was ever scared," he said.

He described the scare which his instructor once had when jumping over Akron airport.

"He bailed out at 5,000 feet," related Moore. "When he had fallen a ways, he looked down and saw the huge Zeppelin hangar directly beneath him—too close for him to pull a 'chute even. He shut his eyes and prepared for a crash and oblivion.

"The hangar had seemed to be much less than 500 feet below him.

"When nothing happened and he kept falling he slowly opened his eyes and discovered that the hangar was still 1,000 feet beneath him. The extreme size of this biggest building in the country, had completely fooled him."

Turning to more serious subjects, Moore said that he believed every commercial airliner should be equipped with chair packs for each passenger.

"These chair packs have been tested and found practical and workable," he explained. "Although there is always much controversy between the parachute companies and the commercial airliners when the subject of carrying parachutes for passengers arises.

"The ones we have tested open automatically and let the entire seat down through the floor of the plane. All the passenger has to do, is to sit."

END

An Airy Chat With the Editor

(*Continued from page 9*)

BUT—we're only down and not out. Not yet. We still believe that what has been accomplished by the opponents of amateur aviation can still be overthrown if we can depend upon the earnest support of the amateurs and others associated with amateur aviation. This must be more than a lukewarm apathetic support. It must be accompanied by determination and a willingness for self-sacrifice, if need be, to push this thing through as it must be pushed. How many can we depend upon to help us in this last extremity?

* * *

AND, the enemies of the amateur lightplane tell us that amateur constructions are dangerous and flimsy. That is the main burden of their song and the plausible story that they gave to the various legislative bodies. If they, themselves, were blameless in causing many of the airline wrecks that have accompanied their promotions, we would be much inclined to listen to their story.

* * *

IF OUR detractors are so perfect in the conduct of their own operations, how is it that the newspapers record, almost daily, accounts of fatal accidents to factory-built licensed planes flown by licensed pilots? In view of the actual facts in the matter, the present regulations are not particularly effective in reducing airplane accidents—few of which can be charged to amateurs. Strict compulsory regulations, like all autocratic regulations, rather fall short of their objective in actual practice.

* * *

PROGRESS in any mechanical or scientific undertaking is largely the result of amateur experimentation and invention. The laboratories of the great corporations are singularly deficient in radical epoch making basing inventions or discoveries. The amateur experiments for the pure love of the work. The commercial laboratory men work for a salary. And, there is a vast difference in the results obtained by the two methods.

* * *

ON the roll of our great roster of inventors and scientists are many, many amateurs. Amateurs such as the Wright brothers, Bleriot, Curtiss, Alexander Graham Bell, DeForest, Daguerre, Benjamin Franklin, Tom Sopwith, Cayley, Mouilliard, Henson, the Farmans, and a host of others. None of them were employed as research workers in the line of their inventions—they were purely amateurs.

And yet, in view of these facts, the state and Federal governments knowingly curtail the activities of the amateur from which most of our basic inventions spring. It will be quite interesting to watch the progress, if any, of mechanical aviation features from this time on.

* * *

AND NOW, to dismount from our pet hobby, we will discuss another matter of importance. This is on the subject of the tremendous air armada, now under contemplation by our government for our national defense. This is the truly constructive act that we have been waiting so long to see and it is our sincere hope that it will not fall by the wayside before its complete fulfillment.

It is not only the actual airplanes produced that will be of such great importance but the great impetus that it will give to national aviation and industry. More planes call for more pilots, more airplane designers and more airplane workers of all sorts. It will establish all branches of aviation on a firmer footing because of the great sums of money spent and the general improvement of our morale.

* * *

WE HOPE that we will hear from our amateurs at an early date with their suggestions.

J. B. R.

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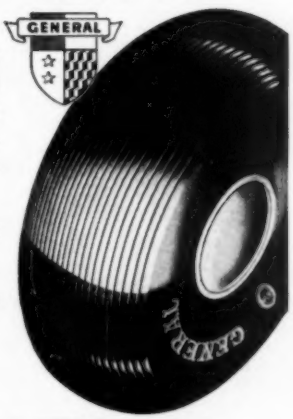

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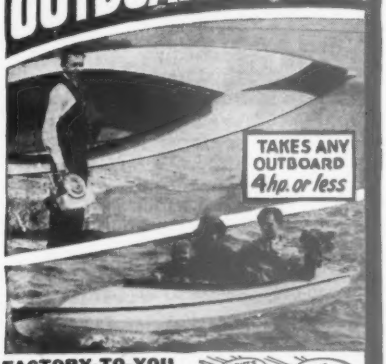

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The National Air Board

(*Continued from page 56*)

the situation, admit that personal inspection by Department of Commerce men is impossible, and leave the task of inspection and certification to licensed and duly sworn mechanics". The Board agreed heartily with this suggestion.

A Multitude of Bills.

Bruce Barton, now in Congress, is seeking to repeal a bill a day, but lawyers and legislators will initiate and pass a hundred new bills for every one he succeeds in deleting from the statute books. In no other matter of national importance have as many bills been proposed at the moment as in the realm of aviation. A newspaper report reads as follows:

"First in importance among aviation measures is the McCarran bill to put all regulation of air transportation under the Interstate Commission, but more than a score of other measures are pending.

"Senator Copeland has a bill pending to create a Bureau of Federal Airways in the Commerce Department to improve safety in the air and 'expedite growth of a coordinated system of Federal Civil Airways'.

"Representative Haines seeks to authorize the Postmaster General to provide experimental shuttle service by autogiro from outlying airports to central city areas for air mail.

"Senator Carraway has filed a bill to require passenger airplanes to carry a parachute for each passenger."

There is no topic which arouses so much excitement among members of the Air Board as this question of national legislation for aviation, and in the heated arguments the Chairman not possessed of a gavel, used knife and fork energetically, not to eat with, but to restore order.

Should Air Transport be Regulated by the I. C. C.?

Roughly speaking the proposals made so far have involved turning over to the Interstate Commerce Commission the setting of rates, the granting of certificates of convenience, the regulation and inspection, and safety work of the airlines.

Members were almost unanimous in rejecting such proposals, on very definite grounds:

1. The I.C.C. knows little of aviation and we would have to educate another governmental body all over again.
2. The I.C.C. has long standing relationships with railroads and business. Would aviation get a square deal from this body?
3. The airlines are all lobbying for I.C.C. control and for the certificates of convenience which would follow. Certificates of convenience mean monopoly, and monopoly would mean the elimination of competition, and with elimination of competition there would cease progress in equipment. Aircraft would no longer be dispensed with, when design progress had made it suffer, and airplane manufacturers would have little inducement to forge ahead in commercial steps.
4. Why let any one at all make rates? Let the airlines compete, fix their own rates, give the public the cheapest rates and best service, and let nature take its course.
5. The Bureau of Air Commerce has been developed at great expense though it is far from perfection. If airline regulation went to I.C.C. there would be two government bodies assuming the same type of function. There would be rivalry. Private flying would suffer a still further set back.
6. If any Commission is to regulate scheduled flying, then it should be an Aviation Commission.

Should Air Commerce be Transferred to an Aviation Commission or to the I.C.C.?

Certainly not, said members. In the first few years of its existence under Bill MacCracken, it functioned splendidly and non-politically. The personnel is excellent and well trained. Too much politics, too legalistic control, too much subservience to an Assistant Secretary with many other things besides aviation to consider, have greatly hampered the Bureau. But who can be sure that a transfer of the Bureau would not make matters worse?

Specific Recommendations to be Sent to Every Congressman

Out of argument and counter-argument, the following concrete suggestions emerged which are to be transmitted to every Senator and Congressman in Washington.

1. The Bureau of Air Commerce should not be transferred to any other Department, Commission or government agency. The Bureau has functioned adequately in the past, when reporting to an Assistant Secretary for Aviation. Let the post of Assistant Secretary be immediately revived. Let him be a man who understands aviation, who has the respect of the flying world, who will render the Bureau less subservient, free it from too many lawyers, keep politics at bay. Very soon the problems of airways, aids to navigation and other important matters will cease to be the sore spot of American aeronautics.
2. Appoint a Commission, but not to regulate air transport in the impartial yet cramping way in which the I.C.C. handles the railroads. Let the permanent Aviation Commission be patterned after the wholly admirable Maritime Commission.

concerning itself with broad matters of national and financial policies, and not seeking to duplicate the Bureau of Air Commerce. Select for the Aviation Commission men as competent as those to whom Maritime Commission has been entrusted.

Ocean Flying

Many views were exchanged with regard to the fine report of the Maritime Commission. Its conclusion that the Merchant Marine Act should be extended to air services across the oceans is admirable. So is its conclusion that other interests including steamship companies should be encouraged to establish services. Pan American has done and is doing a splendid job, and in soliciting bids for huge boats to carry 120 passengers, it is daring, wise and far-sighted. But even "Pan Am" would keep all the more in the van of progress if it had other competition to meet. Incidentally Pan American has been ruthless with its sources of supply. If manufacturers of flying boats had other customers besides this one large concern, they would be stimulated to even more progressive effort.

Mr. Wilford voiced a word of warning. Payload across the Pacific (San Francisco to Honolulu) is only eight passengers and a little mail; with a 5,000-mile range, our ocean operators might be seriously disappointed in their 120 passenger boats. They might actually be able to carry only a fraction of this number across the ocean. "How about increasing payload," said Mr. Wilford, "by increasing the wing load to 50 lbs./sq. ft. and using a form of rail car to catapault the boats into space"?

Ray Quick also thought that we might, Maritime Commission and all, be too optimistic in regard to the equipment. Boeing was building a 92,000 pound boat with only four engines to save power plant complication. The French were ordering *six*-engined boat from Latecoère of 146,000 pounds gross weight, and a *six*-engined boat from Lioré & Oliver of 145,000 pounds gross weight.

When some one suggested that landplanes might be substituted for boats, Mr. Quick disagreed. The flying boat hull might last but little longer in a rough sea, but it had very little more aerodynamic resistance than a fuselage, impressed the public more favorably, and was not limited in selection of airports. A boat could use any stretch of calm water and there was no limit on length of take-off!

NATIONAL AIR BOARD MEMBERS: Alexander Klemin, chairman; Richard Aldworth, A. Raymond Brooks, Ray W. Brown, Reed M. Chambers, Richard H. Depew, Jr., William C. Fleming, Betty Huyler Gillies, Randolph F. Hall, C. S. "Casey" Jones, C. L. Ludington, J. S. McDonnell, Jr., Augustus Post, George B. Post, Dean C. Smith, Earl R. Southee, James B. Taylor, Jr., D. W. Tomlinson, Grover Whalen, E. Burke Wilford, R. C. Wood (Paris) and W. C. Young.

END

Find Kingsford-Smith Tire

THE wreckage of Sir Charles Kingsford-Smith's plane has been found. The weary vigil of Lady Mary Kingsford-Smith and the little son of the man who has been missing apparently is ended.

First tangible clue to the fate of the gallant Australian aviator lost while flying from London to Australia, November 9, 1935, was a tire of his sleek plane —of the same make as Amelia Earhart's —called *The Lady Southern Cross.*

Attached to it, was the broken metal landing-gear of the plane, made at the American Lockheed factory. Both were found floating in the Bay of Bengal, near the gulf of Martiban off the coast of Burma and across from Rangoon. The tire was in perfect condition, hard and undamaged.

A photograph of the tire and landing-gear arrived at the B. F. Goodrich Co. from N. M. Andrews, a prominent citizen of Burma. Since that time, officials have been checking the figures which appeared on the tire in the picture and found they corresponded to those on the famous airman's plane. They also forwarded the photograph to the Lockheed company for verification of the type of landing-gear.

A Lockheed official wired: "Have positively identified landing-gear as that of Sir Charles Kingsford-Smith's Lockheed.

"Inspection indicates," continued the wire, "that Sir Charles crashed on land. If he had landed on water, the wheels would have been folded into the wing, the normal flight position. The strut supporting the gear itself had one shaft twisted."

Goodrich people say that the tire was of special size for that particular plane.

In 1935, after the plane disappeared into the darkness over the Bay of Bengal, the greatest search in aviation history up to that time, was started.

Thirty-seven planes roared up from Penang Bay to scour Sir Charles' route. Malay natives hunted for miles through the steaming jungles, flares in hand. Meanwhile hope persisted in the minds of Lady Mary and other relatives, that the tall Australian, 38 years old, who had circled the globe by air and made many dashes from Britain to Australia, was still alive.

Lady Kingsford-Smith believed he had landed on some remote island. She has never given up hope that he would be found alive some day, it is said.

Ironically, the discovery of the floating wheel and tire, came just as another gigantic search was on in southern seas for another gallant flier—Miss Earhart.

END

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. . . THAT Patrol Squadron Seven, commanded by Lieutenant-Commander Robert L. Fuller, won the Herbert Schiff Memorial Trophy awarded annually to the Naval Aviation squadron or unit with the best record for safety flying during the fiscal year—gaining, in addition, the distinction of being the first Patrol Squadron to be so honored.

. . . THAT Lieutenant-Commander Fuller's Squadron flew its Cyclone-powered Consolidated P2Y-3 Flying Boats, attached to the U. S. S. Wright of the Scouting Force, a total of 2313 hours without an accident of any type—a perfect score of safety flying.

. . . THAT the Noel Davis Trophy, presented each year to the Naval Reserve Aviation Division with the highest efficiency record, was awarded for the second successive year to the Naval Reserve squadron stationed at Kansas City.

. . . THAT this squadron is commanded by Lieutenant-Commander D. W. "Tommy" Tomlinson, assistant to the Vice-President of Transcontinental & Western Air in charge of operations. Furthermore, that the Kansas City unit is composed entirely of TWA pilots.

. . . THAT the Grumman Navy Fighters, flown by the Kansas City Naval Reserve Division, are powered by the same general type of Wright Cyclone engines installed in the luxurious TWA Douglas airliners, which have been flown thousands of hours by TWA pilots.

. . . THAT Wright Cyclones power all of the luxurious Douglas DC-2 and DC-3 Day Planes and Sleeper Planes now in service on American Airlines, Braniff Airways, Eastern Air Lines, Pan American Airways System, Transcontinental & Western Air and many other leading airlines throughout the world.

. . . THAT Wright Cyclones also power all of the Boeing four-engined Army Bombers now in service, Douglas twin-engined Army Bombers, Curtiss twin-engined Army Attack Planes, North American Observation Planes, and Grumman F3F-2 Navy Fighters; also the Martin Bombers, Curtiss Hawk 75 Pursuit Planes, Vultee Attack Bombing Planes and many other types of military aircraft.

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Has a Modern Air War Been Fought?

(*Continued from page* 18)

"Sir, we have three very good reasons, the first is we have no oil."

The officer said hurriedly, "You need not give the other two reasons."

The reason the air forces have not played a decisive role in the "three wars" is either because there have been no air forces or the nations which have had them have not seen fit to use them probably for political reasons.

There is a school of military thought, the ablest disciple of which was the late General Douhet of Italy, which holds that air forces may be decisive in a modern war. Such forces must be ready to strike the minute war is declared or even before it is declared. Large fleets of giant bombers hit a city, a railroad terminal, a manufacturing center vital to the enemy nation, a vast commercial roadway, such as New York city and harbor, and wipe it out with one attack or a series of closely coordinated attacks. By such methods striking such horror in the hearts of the opponent people as to destroy their will for further conflict; so to reduce their capacity for the manufacture or delivery of war materials that they will realize the futility of further resistance.

Do I credit such a picture? Do I place any reliance in the probability of such an eventuality? Will it happen? I do not know. My crystal ball does not show the answer with clear definition. And here is where I pick a quarrel with those turnip-brained, old-fashioned experts who do see such clear pictures in their crystal balls—who are so sure that air power will have no vital effect in national conflicts of the future; who would have this nation stick by its ships and its doughboys and neglect its air forces. Their powers of divination are no better than mine, but they are positive in urging this nation into a course which may conceivably bring it to national ruin.

This I do know. A modern air force possesses the ability, the brute power, the dynamic capacity to do just that—to destroy shipping, terrorize congested districts, interrupt communication, stop manufacture and materials production and raze cities. I say there are good reasons to believe a great part of that Douhet picture. It is certainly not without the realm of possibility now and it is coming closer to definite actuality with every passing day.

Many of the leading nations of the world are now having troubled sleep over the Douhet dream. If you don't believe that, look at the aircraft factories of the leading nations of the world, working three shifts, striving night and day, frantically turning out giant bombers with two and three thousand mile range; watch the great cities of the continent hanging balloon barrages about their borders, see them feverishly building fighting planes and anti-aircraft guns at top rate. Look at England. Once upon a time, not so long ago, she spent 60 cents of her armament dollar for her navy, 25 cents for her army and the rest for her air force. Today she is spending about 35 cents for her navy, 25 cents for her army, and 40 cents for her air force out of every rearmament dollar. Look at Germany, spending more than half her armament dollar for aviation; look at Italy spending over 40 cents of her national defense dollar for her air fleet. If the other leading nations of the world are wrong, they are certainly unanimous in their error.

The wise, patriotic American will keep an open mind; he will look dispassionately at the experiments abroad; he will see the wisdom, at least the practicality of following the international trend. He will scorn those who, through self-interest, bigotry, passion or ignorance, would deliberately mislead him about the elements of national defense.

* * *

Note: the opinions expressed herein are my own and intended to reflect in no way the views of the War Department or any member of the Military Services.

JAMES E. FECHET.

END

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Air Travel a la 1940

(Continued from page 26)

and haze. Atmosphere there is less than one-third as clear as at high altitude.

"Should another stratosphere flight be made to even greater altitude than we attained, it certainly would be worth while to make pictures of the sun's corona with special cameras, taking advantage of the relatively dark sky that exists at great altitudes. It is theoretically possible to photograph the sun's corona in broad daylight."

Experts vary in estimates of the eventual altitude and speed at which flying is practical. One guess is 100,000 feet, with speeds up to 1,000 miles per hour, but Major Greene says that 40,000 feet is a reasonable objective, and Major Stevens frankly does not believe that airplane engines can reach a high as balloons. As for speed, he points out that sound travels only about 700 miles per hour, and doubts if man, at any time, will be able to outdistance sound in an airplane.

Cruising speed of between 450 and 500 m.p.h. by 1947, is confidently predicted by Martin. He adds that such flying will be practical only for long hauls, with not more than one stop transcontinentally. His chief American rival in building big flying boats, Igor Sikorsky, agrees with the speed prediction, explaining that "to go faster than 500 miles, some different type of craft will be needed. Perhaps the rocket, although the practicability of the rocket is probably more than a generation away."

Mention of rockets suggests Earth-to-Mars flight, and it must be admitted that chances of developing a real space ship are improved by stratosphere exploration which already has proved that humans cannot hope to survive trips to outer space unless protected by sealed chambers.

Advantages of flying in the stratosphere, other than high speed and freedom from storm, include constatnt celestial observation, Major Greene points out. Always able to see the sun, the pilot can navigate with complete accuracy. Clouds rarely extend into the stratosphere.

Paralleling high-flying research is the development of automatic flying equipment. Already the army has developed a plane that lands itself, "hands off." Automatic radio navigation has reached the point where planes fly themselves from station to station on a course, tuning in automatically on successive station wavelengths. Landmarks and beacon lights, vital to flyers a short time ago, are neither visible nor needed at high levels.

Overcoming handicaps of reduced temperature, pressure and oxygen, the sealed cabin is believed to provide the means of safe and sure stratosphere travel. What lies ahead in military stratosphere operations is a companion picture that army experts leave to the civilian imagination.

Mars and Mercury, gods of war and communication, may be expected to put their heads together, agreeing, "Tomorrow We Ride the Stratosphere!"

END

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It's Never Too Cold for the Army

(*Continued from page* 49)

A study of the problems of working clothes for enlisted men during cold weather.

The abandonment of all light grade oils for winter flying, because of undue wear on engines.

Development of an air filter for use when encountering dust storms in the northwest.

Further development of the self-bucking riveting device.

Design of suitable airplane ambulance for snow operations.

Development of portable office equipment for installation in transport airplanes for use on long trips of this nature.

Redesigning of engine covers, since the covers tested were entirely unsatisfactory.

The First Pursuit Group has not been the only unit of the Air Corps to make mid-winter test flights. The GHQ Air Force, under the command of Maj. Gen. Frank M. Andrews, conducted a service test of various aircraft equipment under conditions of severe cold weather for fifteen days beginning February 1, 1936.

The fields selected by General Andrews for the maneuvers, after an aerial reconnaissance were: Burlington airport, Burlington, Vermont; Concord airport, Concord, New Hampshire; and the Army air base, Mitchel Field, Long Island, New York.

As actual operations in emergencies do not permit aircraft to be stored in heated hangars the planes which were to be used in the test were kept in the open. At first attempts were made to start the motors with little preparation. This failed and canvas engine covers and gasoline firepots had to be rushed to the scene. These improvised tent covers with the gasoline heaters soon did away with the difficulties and the airplanes were ready to take to the air within 20 minutes. The success of this experiment in warming up engines when the thermometer registers very low, solved one of the vital problems of winter flight for the 60 planes which were to participate in the exercises were able to operate daily.

After the tests were over, the question asked by some was: "Did the Army learn anything?" The answer to that question is—Yes. The army had learned what equipment works and what equipment does not work. They also learned the tactical problems that would come up if the northeastern part of your country and my country should ever be invaded during the winter months by an enemy air force. The tactical phase, however, was a secondary objective of the maneuvers; the primary purpose being to test equipment.

What about ice formation on wings and the other exposed parts of an airplane? That is a factor that was not noticeably a handicap in the tests discussed. This was due to the fact that there were no long duration flights. It is nevertheless one of the great hazards of winter flying, and may occur at high altitudes during the summer months. It takes the form of ice deposits on wings, and all other parts of the plane which are not protected from the elements, causing the airplane by its weight to lose altitude rapidly and even to become completely unfit to fly.

The army has not turned a cold shoulder to this hindrance. Along with the commercial aviation world they have been working constantly to solve the problem; for airplanes with more range are being designed, and prolonged flights, both civil and military, have become a daily happening in all parts of the country, and in all seasons of the year. Hence, the urgency to overcome this danger.

One of the latest de-icers experimented with at the Army Air Corps experimental station, Wright Field, Dayton, Ohio, has been one which has been installed on a B-12A airplane. It is the propeller slinger-type which distributes an anti-freeze liquid over the propeller blades; the regulation of which is controlled by the pilot. At will he can start, stop, increase, and diminish the flow of the solution. This, with the installation of rubber type de-icers to the radio mast and the radio loop provides an airplane with a complete de-icing system. Time and tests will prove how effective this experiment will turn out.

It has been just such sub-zero test flights and research work as these in this country and other nations which made it possible for the Russian aviators to pay us that memorable visit during the summer of 1937, and to establish an airdrome on the ice floes of the Arctic seas—a pioneer venture foretelling what is to come. The Atlantic and the Pacific have been conquered for the airplane; the Polar seas come next.

Several months ago, POPULAR AVIATION printed an article in which the future of arctic flying was predicted and the Air Corps are rapidly making this prediction an immediate truth. From the laboratory to the field test and then further tests in service will tell us the story of arctic conquest. And the Army will win—depend upon it.

It was the pioneer transoceanic flights of the U. S. Army Air Corps that paved the way for the air routes across the Atlantic and the Pacific. Indubitably it will be partly due to their intensive work in laboratories and fields on the subject of winter flying that the Arctic regions will be opened permanently for aerial transportation. When that day arrives the world will indeed be neighbors. Swift communication between nations has a tendency to make the world "Good neighbors."

END

Dumb-bell

(*Continued from page 56*)

start back in a little field at Caspar, Wyoming. Captain Keefe was a very clever, good looking chap, and a great joker. He had cut quite a swathe among the fair ones of the town and he was departing with a large audience, practically the whole town, to wave him into the air.

There were no chocks under the wheels and Keefe got out of the plane for some reason. Schaefer was in the cockpit of the plane and the throttle stuck in a wide-open position.

Instead of reaching down when the plane began to move, to shut off the switch, Schaefer lost his head and jumped out. The plane veered, sweeping back and forth across the field and Schaefer and Captain Keefe ran after—trying to catch it. Aubrey—a great dandy—wore a new pair of English breeches which buttoned at the sides. We called them with great irreverance, his "dandy" pants. They came unbuttoned in the unusual exertion and he couldn't stop to button them and his beautiful peach colored shorts delighted the audience. Every time he'd get started to fasten the things, the plane would circle back at full speed, as though with a vicious intelligence, and make a swoop at him. Once he was knocked flat by an oncoming wing—from the rear. When he stood erect again the beautiful peach colored shorts were gray with Wyoming dust. Finally the ship nosed over into a ditch and broke the prop and knocked in the radiator.

But the worst and dumbest of all dumb-bell tricks was my own. I was "picking them up and setting them down" at a western slope rodeo. The committee on arrangements wanted something particularly spectacular for the last night of the show, which was July Fourth. Some inspired devil suggested that aerial fireworks should go over big—and I was elected. These people were my friends and I've had many profitable business dealings with them, so I didn't like to refuse, although I took a long pull at my pipe when I thought it over. In a moment of unconsciousness I consented—and hardly came to my senses before I found myself in the air with a string of fireworks sputtering from the tail of the ship.

The arrangement had been that I would climb to a fair altitude, then light the fuse which connected the stuff, and circle low over town until the illumination was over.

Every man has his own special nightmare. Mine is a flaming ship. Perhaps it's because I saw too many "flaming coffins" during the war. Whatever the cause, I dread fire more than anything on God's green earth. Fuselage is highly inflammable stuff—and in those days it was much more easily burned than it is now in these days of metal ships

So the skyrockets sizzled and flamed and the roman candles flared brightly, while pin wheels and other decorative and very much alive shooting stars and very light effects burned gayly in the night. My eyes were nearly in the back of my head, what with straining to make sure no spark had fastened its gnawing light on the wings or tail of my ship, and trying to follow the promised course.

The last of the roman candles had flared up and sunk into darkness again and I almost breathed a sigh of relief—when a spark showed on the tail fabric. It brightened almost instantly into flame. I slide-slipped and crossed into wing-overs and barrel rolls, trying to get rid of that flame, so I could be able to get close enough to the ground to drop a flare for a landing light and roll in. The fire was sticking—so I gave it up—determined to land as best I might. I dived as close as I dared, dropped my flares—circled and landed, with that flame burning faster and faster behind me. It took a couple of days and some stiff work to repair the damage—but I never tried being a firecracker again.

There haven't been many new members to the Dumb-Bell Club of late years. Flying is safer now—or flyers are a different type. Most of them are aeronautical engineers, trained in technical phases of designing and building. Ships have fewer limitations and men are trained to foresee and avoid many of the dangers we found to be a part of the day's flying. The old days are gone—but the new days are good days, too.

END

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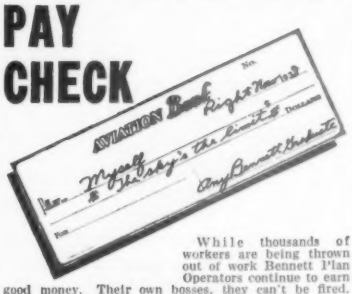

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Little Flower

(Continued from page 24)

signed to LaGuardia. Ellenstein notified the latter, who snorted: "If they are green, send them over from Newark. That'll give them plenty of time to ripen."

In April, LaGuardia offered to meet the Postoffice Department's objections to Bennett Field by putting special mail cars on the city-owned subway at the Church Avenue station and whisking mail to the central Manhattan postoffice He proved he could move mail from Bennett to Manhattan in 50 minutes as against one hour and 50 minutes from Newark airport. Mayor Ellenstein said: "I'm not the least excited. The Postoffice Department has assured us the terminal won't be changed."

Harllee Branch, second assistant postmaster general, gave out the department's decision relative to the use of Floyd Bennett Field for the airmail. He stated that the cost of the transfer from Newark would be between $30,000 and $40,000, and in addition, $115,000 more annually. You can read the papers for the latest developments in this fight. The Little Flower is not licked yet, he says, and has appointed a formidable committee to go to work: Grover Whalen, millionaire ex-Police Commissioner; Joseph P. Day, noted real estate operator; M. H. Aylesworth, radio executive; Louis Comstock, president of the Merchants' Association; Ralph Hitz, president of the New Yorker hotel; Raymond Ingersoll, Brooklyn borough president; Percy H. Johnston, president, Chemical National bank; George Mand, president, Bronx chamber of commerce; and Percy Magnus, president of the New York Board of Trade.

The Little Flower's desperate assault on the military polo stronghold located on Governor's Island, just across from the Statue of Liberty, was based on his knowledge that in 1927, the War Department announced that the island was no longer needed for military purposes, and offered it for sale. While LaGuardia was in Congress, in 1930, the matter of establishing an airport there was being talked about. The Mayor charged that at that time steps were taken to preserve the post from such practical desecration by erecting buildings outside the construction deadline.

The War Department now opposed the Mayor's plan to clear the west and south edge (where the polo and baseball fields are), make a 70-acre fill and establish four 3,000-foot runways. The plan also included a promise by the city to construct a vehicular tunnel from the island to Manhattan, and to construct pneumatic tubes to shoot mail over to the main postoffice. There would be, in addition, no more buildings erected than absolutely necessary for a simple landing field. All administration and other buildings would remain at Floyd Bennett Field to which planes would go after landing passengers and mail on Governor's Island.

On June 15, 1936, LaGuardia made an impressioned plea in person before the Senate Military Affairs Committee in Washington, placing these proposals in the minutes of the session. Major General Oscar Westover, Chief of the Air Corps, saw the possibility of giving enemy planes too good a landing field near Wall Street. Army engineers cried that the Island would become a menace to shipping if used as an airport. Other Army officers exclaimed that the post was indispensable to New York defense.

LaGuardia took the House Military Affairs committee to Wall Street, turned in a riot call at Broad and Wall. In three minutes, sirens were heard. Thirty seconds later, Inspector John Conway and the First Police Division roared up the street and stopped before the startled Congressional party. By 10 minutes six emergency wagons, 10 patrol wagons, 30 radio cars, 75 motorcycle cops and two troops of 50 mounted policemen had arrived.

"The soldiers on Governor's Island would still be waiting for the ferry," LaGuardia exclaimed triumphantly to the Congressmen as he dispatched the bewildered police back to their posts. "To call out the regular Army," His Honor explained, "I have to call the Governor and the Governor has to call the President and the President then orders them out. We don't need the Army to defend lower Manhattan. Why, the Army's real military air base, if the Atlantic seaboard is attacked, will be back of the Alleghanies. Any strategist will tell you that."

Representative Peyser (New York), looking over the Island, exclaimed, "It is a grand club. I'd hate to be kicked out of it." Peyser sponsored an ill-fated bill in Congress to turn the tide. LaGuardia assailed Eugene Vidal, then chief of the Bureau of Air Commerce, for opposing the plan: "Vidal knows about as much about aviation as his boss, Jim Farley. Vidal and his department are the last people in the world to talk about aviation. Not one serious avoidable airplane accident has been cleared up by their efforts."

And so the Governor's Island airport campaign. For the latest, see the papers.

The fight for the airmail has been, of course, inextricably tied up with the campaign to bring Floyd Bennett Field into its own. The fight isn't over by any means, if you realize LaGuardia's tenacity of purpose. Some observers say that he lost an excellent opportunity to show what the city of New York could do in making itself the nation's No. 1 airmail terminal. The Air Corps, busy trying to accomplish the unwieldly job of carrying the mail, obtained a three-week lease of Bennett ending at midnight, March 12, 1934.

His Honor, in a telephone conversation with Major B. Q. Jones, head of the Eastern division of the Air Mail (all territory East of the Mississippi), clashed on the subject of the terms under which the Army would continue to use Bennett for the mail. Jones, dissatisfied with the Mayor's proposal for a day-to-day lease, ordered the mail base transferred immediately to Mitchell Field. No one seems to know exactly what was said during the heated conversation between the two Majors, but the Army moved and that was that.

Meanwhile, LaGuardia maintained a strong and highly active interest in building up the city's airport facilities. The opening of the North Beach field was only one of the developments in his far-flung program. The oath of office was probably still ringing in his ears when he announced an aggressive policy and immediately turned to the subject of getting sky bases for the business districts of the city. The first one in the world to be planted in the center of a city—and a seaplane base, at that—was opened September 5, 1934, at the East River foot of Wall Street.

Plans for the Bronx airport were soon launched and the Mayor proposed construction of a major seaplane base in Manhattan at the foot of 23rd Street and the East River which would provide facilities for the largest seaplanes and amphibians. All of which means, of course, that Floyd Bennett Field is now part of a crescent of airports and bases strung through the five boroughs. Last March, LaGuardia went out to Bennett to preside over the ceremonies incident to blowing up a 227-foot brick chimney that had long plagued pilots using the field. While there, the Mayor made the most of his opportunity to fire a broadside at the Post Office Department for not recognizing the outstanding accomplishments of his administration in making Bennett what it is today. "The Coast Guard has its biggest Atlantic coastline base here," the Mayor shouted, "and this field ought to be good enough for the mail service."

LaGuardia violently opposed the Feld-Sullivan bill in the state legislature to license and inspect airplanes. He accompanied Clyde Pangborn, Ruth Nichols and 50 other pilots in a mass flight to Albany in February, 1935, to protest. Tenants of local airports threatened to move to New Jersey if the bill became law thus duplicating the licensing and regulatory power of the Federal government. The mass flight was successful and New York pilots once more found they had a staunch friend at City Hall.

The Mayor, meanwhile, let it be known that he had no patience with irresponsible pilots. He personally thanked Magistrate Anthony Burke when that official fined 18-year-old Alexander Loeb $50 for setting his plane down on Riverside Park. When LaGuardia learned that it had not been a forced landing, he declared: "There is not a pilot in this country worthy of the name who would not sacrifice his plane rather than take a chance on injuring someone on the ground."

A study of newspaper files shows that few days have passed without some story being published that keeps the Mayor's aviation interest quite apparent to the public. Some of these highlights are: his flight, as Mayor-elect, from Panama to Jamaica which he said was "the best I ever had." Then, interested in autogiros, he flew to a charity air carnival at Roosevelt Field in a 'giro piloted by William Zelcer, and took his place in the reviewing stand occupied by Otto Kahn, Clarence Chamberlin, Ruth Nichols, Elinor Smith, Irvin S. Cobb, Patrick Hurley and a host of distinguished guests.

Most notable of his Albany flights, possibly, excepting the mass protest occasion, was his memorial trip over the route taken 25 years ago by Glenn Curtiss in winning the $10,000 New York World prize. In 1934 he launched the first sky train the world had ever seen. The towing plane, piloted by Elwood Keim, was pulling gliders in charge of two champions, J. K. O'Meara and Stanley Smith, and a noted designer, Dr. J. E. Franklin. LaGuardia then took to the air in a newspaper plane to watch things first hand. He once explained why he doesn't take the controls himself when he flies: "Mayors are too plentiful and planes are too scarce."

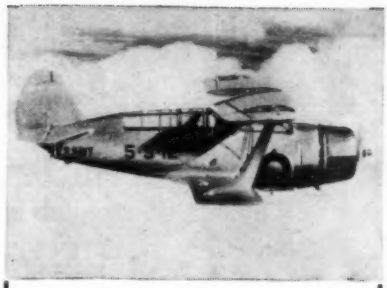
"You mean good mayors?" asked a reporter.

"Yes, sir," declared the Little Flower, "good mayors are too plentiful and good planes are too scarce."

Meanwhile, this Flying Mayor has his troubles. He has the second most important governmental job in the nation. His cabinet is twice as large as the President's. He directs the spending of nearly a billion dollars a year. He inherited a mess when he took office. The first thing to shock him was the Welfare Island scandal which he cleaned up in a hurry; the prison there was dominated by thugs living in princely style—thugs actually under sentence—with the connivance of prison officials. He then opened a campaign to collect $29,000,000 owed the city in property assessments which had never been billed by the preceding corrupt administration.

He conducts the city's business with a fanfare of publicity, as a rule, but gets things done. When he was in Congress, he pulled a lamb chop, beefsteak and pot roast from his pockets while making a speech on the floor of the House. He was showing, by their microscopic size, the high cost of living. When he was invited to a debate with a Jewish political opponent, he stole the show by addressing the audience in flawless Yiddish; his red-faced adversary didn't know a word of it. For a while, he wore a khaki shirt while attending Board of Estimate meetings as a protest to the high cost of laundry. He once had a feud with newspapermen who didn't give him as much space as he thought he deserved during the super-feud between Mayor Hylan and Comptroller Craig.

During a meeting between this pair, LaGuardia was trying to get a few words



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in on his own account. Craig turned to his arch-enemy: "Hit the little wop over the head with your gavel if he doesn't stop talking," he said.

He was never a Socialist but was called one. Socialists were very pleased at this but he has attacked them so often that they've gladly repudiated him altogether. He is scrupulously honest and there are hundreds of proofs of it. He doesn't relish even the suggestion of chicane. He once saw an Army recruiting poster displayed along the street. If stated: "Do you want to go to West Point? Ask the recruiting officer." He protested to the War Department that this was misleading since only one in 25,000 in the Army ever gets to the academy. Posters costing $300,000 were removed from circulation throughout the country.

LaGuardia likes to play the trombone and make spaghetti. He has no telephones in his office; uses an elaborate system of bells to summon his secretarial staff. Newspapermen say he is unrivalled in his ability to call forth anathema and invective. He usually smokes a pipe or cigar but sometimes days pass in the office when he hasn't a chance to do any more than chew at an unlighted butt.

And, incidentally, his middle initial stands for "Henry."

END

The Airport Clan

(*Continued from page* 42)

visiting ships come near operators, they close up the hangar and go fishing. Operators are very taciturn. They rent you old airplanes instead of new ones because old airplanes are better. There is usually grease on the cushions. Operators do not like to hear about the grease on the cushions, and occasionally tell people who complain of it to go somewhere else and fly. Especially dumb students. Sometimes dumb students have to drive for miles to fly as a result. And what if there is grease on the cushions there? You can see what this would lead to. Operators like to pitch quarters to a line, play poker and talk to the railbirds about the summer they barnstormed the panhandle. They do not like to work. Some operators are in the charter business. They would do very well, only they do not have a phone.

Other operators specialize in the good old game of bage punching when the price of a plane can be raised. Otherwise, operators are very much like other airport people. They would get married, but their wives won't let them.

END

Lightplanes

(*Continued from page* 54)

war lightplane engines that unaccountably sprung up in the country at a time when the engine market was decidedly bearish. Prominent among the latter were the Aeromarine radial engines and several two-cycle rigs that served their purpose.

The writer turned out a radial engine about this time that consisted of either three, five or seven Harley-Davidson or "Thor" motorcycle engine cylinders arranged radially around a special crankcase and crankshaft. He also produced some Model "T" Ford conversion parts.

Just after the war, or even before the war, really excellent lightplane kit-sets were placed on the market for the home-builder at very modest prices. The writer and the late Ed Heath were busy as bees with these kit-sets at the time and out of the hundreds of kits sold and erected, we have yet to hear of a fatal accident with them.

About 1919, Capt. V. E. Clark came along with his celebrated Clark "Y" wing section that proved of such great assistance to the amateur, not alone for reasons of efficiency but for the fact that it was a fairly deep section that permitted the use of deep strong wing spars.

This, of course, reduced the amount of interplane bracing and led the way to still deeper wing-sections and cantilever construction. Up to the advent of the Clark wing-section, the wings were so thin and the spars were so shallow that double-panel interplane struts were made necessary for the intermediate support of the spars.

And many a barn, cow-shed and basement was employed as an airplane factory by the thousands of young men who were determined to fly—cost what it might. Those that had the ready money bought the factory-made product. Those that didn't have the money, bought kit-sets and built the planes themselves.

In those days, aviation interest was twice or three times as strong as it is at present because the present generation is prohibited by law from participating in the king of outdoor sports unless they have the money to train for a license and to purchase a licensed ship.

As a final result, we now have a whole flock of fatal accidents with ships landing above 50 m.p.h., and still other accidents due to short and incorrect training, even though it is conducted according to government standards.

END

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Racing

(*Continued from page 60*)

The fact that most of the pilots are "unfortunate underpaid cusses" as frequently quoted is all wrong. I hope this doesn't apply to Roscoe Turner, Major Doolittle or Benny Howard, to mention a few of the prominent names. Those men need not depend on prize money to have their names among those entered. It is primarily a spirit of sportsmanship, and the inner urge of excelling in competition that causes these men to be among those present.

This applies to some of the men who have died in the endeavor to break new records or put on a good show for the "appreciative public" if it exists. Certainly, prize money as now paid isn't the only thing to cause these men to spend time, money, and risk of life in quest of a "first" place around the home pylon.

If the spirit of competition is subdued among pilots or technical designers, aviation will progress much more slowly. The best argument for that is to refer to the World war as an example of competition that really pushed development on. If Lindbergh didn't have it the ocean would not have been crossed. Someone always has to go first.

There is, of course, evil effects if stunting privileges are abused. Personally, the aerobats should not be armed with a big high powered plane and turned loose on an innocent sky to cavort around in. Ernst Udet's marvelous low speed acrobatics without power are certainly more graceful to watch than a hawk falling out of an inverted spin.

Within recent years, the pleasant diversion of flying inverted within a few feet of the ground has been gradually discouraged. While watching a plane in acrobatics is interesting to see, but unless they are executed with grace and skill they are not of value.

The argument is offered that watching stunting planes doesn't contribute anything to flying; a parallel is offered in the tight-rope walker in the circus. It isn't the idea of a man just walking, it is his inherent skill to walk on a narrow wire and defy gravity. Similarly this applies to stunting of graceful nature.

Radio Compass

(*Continued from page 64*)

Assuming that you do get a reading, see that it is not too great, by detuning the set if necessary. The meter will vibrate as voice and music vibrate. That is true, however, only as long as the toy motor is not spinning.

Now throw the switch to the toy motor. When it starts spinning, the meter reading should drop and become steady. It now depends on the direction of the plane. It may read zero, meaning the plane is pointing either directly at or away from the station.

Now fly the plane *toward* the station, guided by your knowledge of directoin. Swing the plane to the left of full course, and see if the meter hand swings left. If it swings right, intsead, reverse the connections to the carborundum crystal as previously explained. This should make the hand swing off course to the left when the plane swings left, right when the plane swings right, so long as the plane is going to and not away from the station. When the plane is flying away from the station, with the carborundum properly connected, it will be indicated by a reversal on the meter: left will send the hand right, right will send the hand left. Thus you have your compass completed. You can line your plane on a straight course, *at* the station.

Figure 4 shows how the Bureau of Standards plane at College Park checked its direction to Washington, Baltimore, and Philadelphia.

Figure 5 shows a trick I played on my good friend and excellent pilot, Henry Walburn, of this city. I put loop's center tap off-center. That sent the plane at an angle. Henry, unknowing, decided to test the compass against his own eyesight by flying toward WRC. The dotted line shows the path the compass led him. The importance of this demonstration is: *even with the loop improperly set, you'll reach destination eventually.* Henry came down all in a lather, wanting to know what was wrong. With the center tap connected again in the center, the plane flew straight as an arrow to WRC.

END

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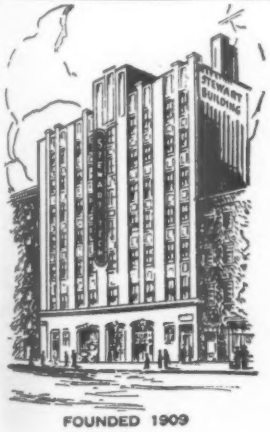

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Rum Running

(*Continued from page* 14)

uneasy. Their anxiety increased with each passing moment that failed to bring him in sight.

When he was two hours overdue, my mechanic and I took off to look for him. All the way across the Gulf Stream, we scanned the water with high-powered field glasses, but with no results.

Upon reaching the Florida coast, we flew low over the field where the lost flyer was supposed to have landed. There was no sign of his plane or its wreckage, nor were there any tracks or tail-skid marks to show that he had landed there. Things really looked bad. We were convinced that he'd gone down in the ocean on his way over from the island.

Skimming low over the ground just at dusk, on the way to our field, we added to the excitement by accidentally flying through a high-tension electric line just west of Hollywood. We parted the cables and plunged half the city into darkness for the rest of the night. Miraculously, neither we nor the plane were harmed by the high-powered current.

When we reached our field, I landed but never stopped rolling. The mechanic jumped out and started for the Miami airport, about two miles away, to get in touch with the missing pilot's family. In the meantime, I was back in the air on the way to West End.

As I learned later, the first person my mechanic saw at the Miami airport was the missing pilot! He was just getting into a roadster, and in the rumble seat was the propeller of his big Fokker monoplane, bent like the horns of a Texas steer.

The pilot explained that all his troubles began when his ground crew wasn't on hand when he arrived at the field that was his original destination. He had flown ahead to an optional field, which was often provided for use if the authorities happened to be watching the original spot. When he landed, the heavily loaded plane bogged up and nosed over in the muddy field. He had a hard time trying to find a propeller big enough for his engine, and, in his haste to get the ship back in the air before it was discovered by officers, he had neglected to send the island a wireless that he was safe. However, when he went to Miami to find how mechanics were progressing with repairs, he learned that the plane had already been seized by federal agents.

Later, this pilot met with the inevitable fate in store for him and most of the other rum-running pilots. As he landed on a field close to Miami, he saw some officers coming in an automobile. He reopened the throttle in an attempt to take off, but the heavy load kept him on the ground until the car was nearly in front of him, blocking the plane's path. He taxied right into the car. The whirling propeller knocked one of the headlights more than a hundred yards, but that didn't help matters any as far as his capture was concerned.

Speaking of narrow escapes, this one ought to head the list: With his plane cracked up on a field near West Palm Beach, a liquor pilot and his ground crew worked frantically all night, repairing a crushed wing. They were afraid the accident had been reported, but figured that officers wouldn't come to investigate until the next morning. So, if the wing could be repaired before dawn, he might be able to get away. Just as the sun came up, they bolted the wing in place and tightened the bracing wires. A few seconds later, officers appeared just in time to see the plane taking off. The motor had been cranked and warmed up even before repairs had been finished.

One of the only four liquor pilots forced down in the Gulf Stream floated for 52 hours without food or water in a tiny inner-tube boat. Bound for Florida with a heavy load, his engine suddenly began revving down about halfway across; then it stopped dead. The plane, not having pontoons, floated less than ten minutes, leaving the pilot at the mercy of the elements in his makeshift life-boat. He had saved about a quart of liquor from his load, and survived on that until picked up 52 hours later, in a serious condition, by an oil tanker bound for Philadelphia.

"Who's Afraid of the Big Bad Gulf?" must have been his theme song, for he was back on the job with another ship in a short time. But, strangely enough, he admitted that, on his very first flight, his engine stopped just as he neared the island. He was barely able to glide in for a dead-stick landing.

Another pilot who had to go down in the "drink" was luckier; he came down right at the bow of a steamer. About 30 minutes out from West End, the oil line broke. Immediately, he turned back toward the island and began throwing out the cases. After ten minutes or less, the engine quit just as he sighted a steamer. Gliding down toward the boat, he circled around it to attract attention, then landed in the water directly ahead of it. The airplane sank from under him just as he was reached by a rescue party.

"Whiskey Jim," one of the first liquor runners to operate from the Bahamas by airplane, wasn't so fortunate. One morning, about four years ago, he taxied out from the island in a Waco seaplane with an unusually heavy load. According to witnesses, the load was evidently more than the plane could lift, for he was still taxying when he disappeared over the horizon. That was the last time he was ever seen. No trace of him was ever found. Apparently, he had intended to taxy all the way across to Florida. It was reported that he was badly intoxicated at that time. And he must have been, for, otherwise, he would have undoubtedly turned back and lightened his load enough to get off the water.

"Whiskey Jim," incidentally, was one of the few exceptions to the rule that *none of the pilots drank.*

The other pilot lost at sea had delivered his load all right and started back to the island, but never arrived. It was rumored that his mechanic purposely neglected to put enough gasoline in the tank for the return flight, but there was no real evidence to support this theory.

Steadily, the number of airplanes at West End became fewer as the Customs authorities and Border Patrol redoubled their efforts to wipe out the aerial rum-runners. Most of the outfits were caught; others "resigned" when things became too hot for them. Most of the flying

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began to be carried on at night. On the field at West End, the runway was marked by gasoline torches after nightfall, and whenever a ship landed, it nearly always blew out the lights as it passed them. During busy nights, the torches had to be relighted every few minutes. The runway was fairly long, but wasn't straight, having a slight bend about midway. It was, perhaps, the roughest and most treacherous runway, especially at night, ever used regularly by airplanes. Only by great skill and precaution was it possible to take off at night with a heavily loaded airplane.

One of the biggest "hauls" ever made in the war against liquor running from West End was the confiscation of a large Boeing biplane, 50 cases of liquor, five people and three automobiles near Tampa. The pilot, a veteran rum-runner with over 300 successful trips to his credit, had already retired from the game with practically all of his earnings still intact. But, at this time, he was substituting for another pilot for a day or two. The plane nosed over in landing, and much time was lost in getting the machine back on its wheels. They had just finished the job when the Federal Agents came up and seized the whole works.

Right here, a few words about the inhabitants of West End might be of interest. As I mentioned before, practically all are Negroes, but they consider themselves on a higher social and intellectual level than the average Negroes of the United States. It's true that illiteracy is almost unknown there, an excellent school with competent teachers and up-to-date textbooks being provided.

Keen-minded and active, the natives of this tiny island settlement always displayed great interest in aviation. Airplanes were as commonplace to them as automobiles are to us. In fact, most of the younger natives have never seen any cars except the few Fords and the Chevrolet truck brought there since 1932. Many of them can identify nearly any make of airplane, or can explain the purpose and operation of its parts. One 14-year old Negro aviation enthusiast of the island never missed an opportunity to take a flight with one of us. He made so many flights that it no longer thrilled him, but he's never ridden on a train—in fact, has never seen one. He can recognize over twenty different makes of airplanes, but wouldn't know a Buick if he saw one. He knows every part of an airplane and its engine by name, and is familiar with the operation of the controls and the principles of flight. Yet, he has probably never heard of "No-Draft Ventilation".

The liquor planes brought great prosperity to the little settlement of West End; in fact, the natives refer to the period of smuggling as "boom" days. Commissioner Bow, dusky representative of the British government on the island, became quite wealthy from the collection of clearance fees on every case of liquor exported. The export of liquor from West End was, of course, perfectly legal as far as Commissioner Bow was concerned, since he wasn't responsible for the destination of the goods after they had been cleared according to the laws of the British Empire.

It was reported that Commissioner Bow once paid a pilot $200 to loop his airplane. Evidently, he had never seen an airplane loop, and must have had doubts as to whether such a maneuver were possible.

Fishing, by the way, is just about the only occupation of the Bahama natives. Sometimes, the bay at West End would be so crowded with fishing vessels that there was scarcely room to turn around. All the boats were built in a completely equipped boat-yard by skilled workmen. Nearly every type of craft, from the small dinghy to the well-appointed cruiser, is represented. Practically all the natives, from the age of 12 years up, are highly skilled seamen.

During what turned out to be my last flight with liquor, I ran into the worst flying conditions I've ever seen. As my mechanic and I took off just before dawn, ominous clouds were gathering. Visibility became gradually worse as we flew on toward the coast of Florida. Violent gusts were tossing the ship around, nearly wrenching the controls from my hands. About halfway across, it became increasingly difficult to see the horizon. And, without blind-flying instruments, that is absolutely necessary in order to keep the ship on an even keel. Then, the horizon disappeared entirely. The sea and sky blended into one vast curtain of dark grey. For an eternity, it seemed, I tried to keep the ship flying level. I knew it was hopeless, though, unless the horizon re-appeared mighty quick. For one awful moment, the ship seemed to hang poised in the air while the left wing dropped, then it started settling fast. At that instant, the rays from a lighthouse

(*Concluded on page* 90)

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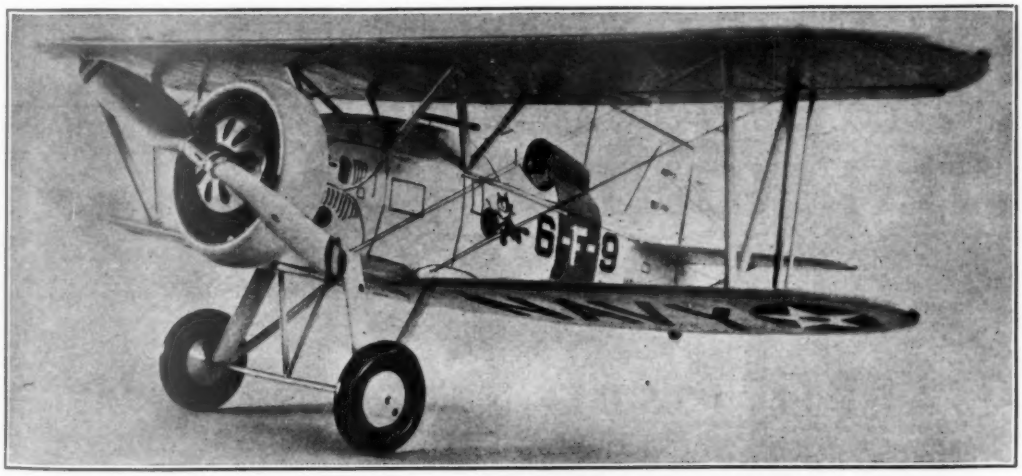

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Rum Running

(*Continued from page 89*)

or beacon flashed across the windshield. My sense of balance thus restored, I righted the ship—and none too soon. Immediately afterward, the air cleared up and I was able to breathe normally again.

We landed on a field near Hollywood and unloaded. As we started to take off, a man on horseback came riding up and stopped right in front of the airplane. I kept thinking he would say something, but he only sat there and stared. I discovered later that he had been just a "spectator"—a friend of one of the ground men. But, naturally, I thought he was an officer of some kind. And while I was thinking, the real federal agents arrived, apparently from nowhere. In the meantime, the horseman did a disappearing act.

One of the men jumped into the cabin. For an instant, my mechanic was on the verge of pushing him out while I reached for the throttle, but the uncomfortable presence of his gun made us abandon the idea. Then, I started to switch off the still idling engine.

"Hey, don't do that!" shouted the officer. Evidently, he didn't know what the switch was for, and thought I was up to some trick.

I explained the purpose and operation of the switch, and he turned it off himself. He was trembling like a leaf, and he sat there nearly a whole minute turning the switch on and off, apparently trying to hide his nervousness. I might mention, to his credit, that this nervousness wasn't due to fright; it was only excitement over his success.

Incidentally, I believe that I owe my life to the fact that I was arrested at this particular time. Inspection of the plane revealed that it couldn't possibly have survived another flight. Evidently damaged by the storm encountered just before my capture, the stabilizer spars had split and pulled away from the attachment bolts. Only the bracing wires were holding the stabilizer in place. The slightest undue stress in the air would have carried the tail away.

In view of the expenses involved, the aerial rum-running business didn't really pay in the long run, unless the income provided enough money to buy a new airplane every week, pay fines and other "overhead" expenses, and have a fair profit left. Even then, there was no guarantee that the pilot would not be sent up for a few years.

There is now stored at West End several thousand dollars worth of airplane and engine parts, tools, equipment for welding, and one complete airplane in good condition. Abandoned by the various liquor pilots, this equipment will be likely to stay there for a long time. Yet, anybody may have all or part of it, absolutely free, simply by going after it—if he doesn't mind paying a heavy import duty. The owner of the plane on the island offered it to one of the pilots, free of charge. Of course, he realized the "catch" in the generous offer and turned it down. The expense of bringing it into the United States would have just about equaled the value of the airplane. And the same fact applies to most of the other equipment abandoned at West End. Like buried pirate treasure, it lies ready for anyone who cares to claim it. But it would be cheaper—much cheaper—just to buy the stuff here in the United States.

Sometimes I wonder whether the flying experience I gained will outweigh the penalties I paid—not the least of which were the lost confidence of some of my closest friends and the forfeiting of my transport pilot's license.

END

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APRIL ISSUE

POPULAR AVIATION 25c

ON SALE ON ALL NEWSSTANDS MARCH 10

British Columbia

(*Continued from page 57*)

ice, wore out nine Liberties and flew a half million miles before it was retired in 1929. A new Boeing took its place.

In addition to government emergency fields, airports are located at several smaller cities in British Columbia, including Trail, Vernon, Prince George, Grand Forks, Cranbrook and Chilliwack. However, since most British Columbia towns are situated on large bodies of water, seaplanes are more popular than land planes.

The future for aviation in British Columbia looks very bright. Imperial Airways recently announced plans for a trans-Pacific service to the Orient and Australasia, starting at Vancouver.

British Columbia is also in the path of the proposed Pan American line from the U. S. to Alaska. This route may follow the coast from Seattle, or start in Spokane or Wenatchee and traverse British Columbia via the Okanagan Valley, Prince George and the less foggy route to Fairbanks.

END

Letters—Letters—Letters

(*Continued from page 58*)

Aeronca "K." In about eight hours I was ready to solo. I wear glasses, but I'm not quite blind. The doctor said: "I am going to be fair with you, my boy" . . .

My eyes tested *above normal* required for a private license. Then he brought out a book with a lot of colored dots arranged on a circle. Interwoven in this design is a number. I read two or three numbers. Evidently the numbers were different from what I read. He told me that, being slightly red-green color blind, I could ont accurately judge distance. Four licensed transport pilots have told me I could safely solo. The doctor went on to explain that if he issued me a permit and I should pile up, the Department would take his job.

At the present time I have 16½ hours of dual instruction. By all rights, at least eight of these should be solo.

CHARLES PITTMAN.

Evansville, Ind.

* * *

Ready to Solo . . .

Sirs:

"They Said I Couldn't Fly" applies to me too. I have about ten hours to my credit, but have not soloed. I was taught by an experienced pilot who is now the manager of an airport here. He told me I was nearly ready to solo, but would have to get a permit first.

The doctor told me I was perfect in everything except my eyes. He said he couldn't issue a permit unless it was okay by the Department of Commerce. So my reports were sent to Washington. About three weeks later I received a registered letter saying my permit had been refused.

My instructor said he couldn't see anything wrong with me and that I flew just as good—and better—than some of his other students. I am a holder of an automobile license and have driven for eight years without any trouble. I drive a car in my work from 6:30 a. m. to 10 p. m. and my eyes never bother me.

CHARLES R. PENNER.

Newport, Rhode Island.

* * *

"Application Denied" . . .

Sirs:

On September 22, 1937, my instructor and I flew to Washington, D. C. I took the examination for a student pilot's certificate. On October 16 I received a report stating that I had a weak right eye and the application would, therefore, be denied.

That report knocked me for a loop, knowing I have flown and can still fly safely according to my instructor and other pilots around the airport.

I do not want to pilot a transport; all I want is a license to fly my own little ship when my day's work is over.

EARL NAPIER.

* * *

Indian Givers . . .

Sirs:

Last May I applied for a student permit, received it, then soloed a Curtiss *Junior* several days later after two hours of instruction. In the next several days I built up about three hours in the *Junior* and about the same time in a Taylor *Cub*.

Then, much to my dismay, the medical examiner notified me that the medical section had decided that I was unfit for any grade of license whatever, and must therefore return my permit—which I did.

I can name innumerable pilots in my own vicinity; some with only one eye, others with very little in one eye as to visual acuity, several of whom have received permits within the last year. My instructor sent in a very strong recommendation in my behalf, which drew a letter saying my license had been issued in error and that I was utterly unfit physically to fly. Consequently I, a co-owner of a ship, sit on the ground.

If a transport pilot must have a rating to instruct, for Heaven's sake, doesn't his opinion amount to anything?

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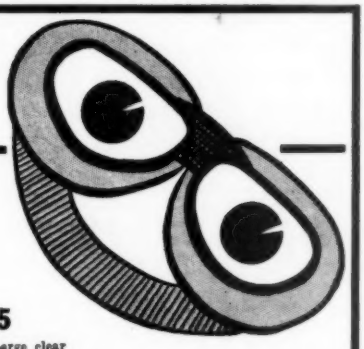

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Old Timer

(*Continued from page* 19)

I climbed to 2,000 feet, flew through scud and saw the silver thread of the Platte river far beneath. I followed that for awhile.

"At Omaha, the red lights they had put out on the field for my coming helped me to a perfect landing. That was all familiar ground to me anyway.

"But when I'd landed there I found the west-bound ship which was supposed to carry the mailbags from Chicago to Omaha and then back to Chicago again, had not arrived. It was held up by snowstorms I heard later. The men at the airport told me the flight was off.

"I didn't want to give up when we'd got that far—so I said, "Give me some coffee and a map, and then I'll take this stuff through."

"I really needed the map more than I did the coffee because I didn't know that Chicago route at all—by day or night. At 2 a. m. I climbed back into the cockpit, warmed by my coffee, and having studied my maps for more than an hour. 'Leave your lights on for an hour,' I instructed the men at the field. 'If I get lost I'll come back.'"

Jack Knight didn't get lost.

Somehow mushing through the night in his old DH "flying coffin," Knight finished that flight. "There wasn't much visibility and the moonlight was A.W.O.L.," he continued. "There was a cross wind, too, which didn't help, but an hour and a half later I hit Des Moines square on the nose."

Jack confessed that the thing which was bothering him most at this time, was extreme sleepiness. The rush of air in his face in the open plane, the unwonted lateness of the hour and the fact that he already had a big day of flying made him fight to keep awake.

"Then a snowstorm came along and I did keep awake," he grinned. "I dropped my plane as low as I dared and began hedge hopping. We didn't have nice instrument flying in those days and it seemed as if sometimes I most skimmed the earth. The gas in my tanks was getting low and I figured I had just ten minutes of gas left when I found Iowa City.

"But even then my troubles weren't over. I knew it was Iowa City, but it was so dark I couldn't find the airport. The crew at the field, it seems, figuring the night flight was interrupted because of the snowstorm, had put out their lights and gone home to bed.

"I couldn't recognize any landmarks so I flew round and round, watching my gas gauge and knowing I could only stay aloft a few moments more. Then about a mile away, I spotted a blessed red flare. I figured someone had put it there for me, perhaps, and dropped down to find that a kind nightwatchman, making the rounds of the field, had heard the hum of my motor and had set out a flare right in the middle of the port. I dropped in thankfully, stopped only long enough to refuel, then set off again into the night, headed eastward.

"There was a high fog over the Mississippi and I jumped over that pretty quickly. At 8:40 a. m. I made Chicago. Someone grabbed my mail bags, and they were shoved aboard another plane which was in the air by nine o'clock.

"Later I learned that pilot E. T. Mallison landed the mail at Mineola, N. Y., at 4:50, exactly 33 hours and 20 minutes after it took off from San Francisco."

Jack Knight leaned back in his chair, his story finished. He didn't tell me how the newspapers all over the nation that day—February 22, 1921—blazoned with headlines announcing an almost continuous night flight of the air mail, and a record established of 33 hours and 20 minutes from coast to coast. The pilots had hoped to make the flight in anywhere from 36 to 40 hours, so this was even a bigger triumph than they had anticipated.

Two days later, Congress appropriated $1,250,000 for continuing the air-mail service and also appropriated expenditures for lighting the airways. This work was completed in 1924, and within a year, regular day and night mail service 'cross country was on in full swing. Thus Jack Knight and his buddies, winging through an uncharted sky, saved the day for the airmail.

It was a grand story—and Jack's comment as he sat there fingering a paper weight made in the shape of a plane, wound it up beautifully.

"A hero?—Why any pilot would have done the same. I just happened to be there at the right time, that's all. It was nothing that any of my fellow pilots wouldn't have volunteered to do," he said.

It is related that Jack Knight made a prophetic remark that night—a remark which has long since proved true. "Some day," he said, as they congratulated him on being able to fly through the darkness,—"Some day I will be doing a great deal of flying at night."

At that time the prophecy sounded like a pipe dream. But in the past few years as he has piloted the big United planes from Chicago to Cheyenne, Jack's runs have been almost entirely "night flights."

Today he says, "It is difficult to say what single advancement is the most important that I have seen take place in my 20 years of flying. Radio, perhaps, instruments, airplane design improvement, and other things. But the refinement of aircraft engines is as important as any development. In the early days, landings on account of engine trouble were the rule and we all expected them.

"The night I flew the mail I was all banged up from a forced landing while negotiating a new pass between Cheyenne and Laramie the week before. I

broke my collarbone and had a big plaster on my nose.

"But these new 1,000 h.p. engines are marvels of efficiency. Judging by past progress, I am reluctant to hazard a guess as to what airplanes will be 20 years from now."

"Still you haven't told me your greatest thrill," I objected.

"Maybe it was the day I made my will," he laughed. "I was flying the mail then over the Alleghanies from Cleveland to New York. I had got about 20 miles from Bellefonte up in the mountains, then called the 'graveyard of the aviators.'

"Suddenly something closed in and the visibility was about zero-zero. It was the days when the only way we had of getting weather reports was to 'phone ahead from one town where we landed to a farmer at the next town, or to stick our head out of the cockpit and get the feel of things ourselves.

"I knew that my gas was running low, and had figured I had about enough to reach Bellefonte. Then with the visibility getting bad I figured it was about all up with poor Jack and I began to write my will. Any minute I expected to hit a peak in the fog, and I figured if I tried to go lower, I'd find zero-zero there, too.

"I wrote down everything I could remember that I owned and willed it to someone, signing my name. And then I decided to go down a bit anyway as I only had a speck of gas left. Fortunately I came out in a little hollow between two mountains and to my amazement there was a town beneath and one sign which I could read. The sign said 'Mifflinburg Carriage Shop,' for it was in the days when carriages were still being driven. I have always blessed that old carriage shop sign. For I immediately got my bearings and flew on to Bellefonte only a few miles distant, refueled and went on."

The interview was over. We shook hands again, Jack to depart immediately on his night flight to Cheyenne, I to fly eastward to Cleveland. Soon after I read that Jack had been voted the most outstanding of all transport pilots, in a national magazine poll. Then came the news of his new appointment.

I notice it says in one paragraph that Jack will have headquarters in Chicago, "but will cover the entire system."

I was right after all.

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END

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Flying Newshawk

(Continued from page 62)

ANOTHER cute assignment was to fly in a four-motored Fokker F-32 landplane bearing an experimental license. The managing editor figured that that type of plane would be the future air transport of the world. He was right as events of this year bear out, but he was too many years ahead in his line of thought. The ride was a noisy, but pleasant one. Good story, sure. The plane burned up three days later. More than one insurance company was provoked at that. . . .

FLYING with an attack group during the 1931 Air Corps maneuvers that covered more scenery than a Cook's tour didn't exactly win the favor of my insurance folks, either. But the one that really did stir them was on the occasion of a little 2,000 mile trip that started out several years ago with a pilot who had 73 hours in his favor. The story was to cover the All-American Air Races in Miami and, in the same connection, cover a sportsman pilots' cruise to find out how the sporting side of aviation got along. We were about last in the air race from Savannah to Miami and decided the race was in vain for us. So instead we took to racing an automobile along Daytona Beach. Just as the race was waxing hot in our favor a big inspection plate pulled off the right wing and left an ugly hole. It threatened to open up the fabric wing in good style, but fortunately didn't. We landed at Cocoa, Fla., and had a garageman fix it. At Miami we arrived just in time to watch, from 2,000 feet, a Marine pilot bounce from his disabled plane and save his life with his parachute. That would, of course, tend to upset the mind of any 100-hour-orless pilot, so we landed in time to force an Army bomber to take another pass at the field. . . .

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Beware the Silenced Warplane

(*Continued from page* 12)

pitched blade. The same thing happens in the air, and noise created by propeller blades comes under several categories. The rag-tearing effect noted at certain angles is produced by the vortex sounds or the shedding of air eddies off the tips of the blades.

If German engineers have succeeded in completely silencing the plane, they have learned something about propeller sound and propeller design we in the United States have been unable to fathom—or have we?

It may comfort many readers, however, to know that the U. S. air services have been experimenting with silenced planes for several years. Some time ago they produced a silencer for the Curtiss *Conqueror* engine mounted in a Douglas observation plane. Flying at full speed at 8,000 feet, the plane *could not be heard* from the ground. Later they added a new style of camouflage and, according to witnesses, this added baffler made the plane practically invisible from the ground.

Regardless of the propeller problem, there is every reason to believe that the successful silencing of engines will be an important step in the eventual complete muffling of the airplane. Already there are about a dozen effective motor mufflers available for aircraft engines, most of which seem to fill the very exacting bill presented by airplane designers.

Formerly, most mufflers could only offer a fair degree of silencing with excessive weight and dangerous back-pressure.

It has been found that the sleeve-valve engine has been the simplest to muffle. Ordinary tappet valves are comparatively noisy and another problem involved, which few consider, is that of deadening the hiss of the intake through the carburetor. The actual sound characteristics of motor exhaust noise must be blamed on the acoustical properties of the cylinder and exhaust ports which give out bands of low frequencies, the lowest of which are somewhere about 200 per second. The turbulent flow of gases through the exhaust port offers a group of high frequencies ranging between 3,000 and 8,000 per second. A good silencer then, must be capable of handling both high and low frequencies at varying amplitudes.

Actual information on the progress made in this country is hard to obtain, but we have received very complete information on the various types of silencers now in use abroad. The Skoda company of Czechoslovakia have been working on the idea for years and we believe they are being backed up by several European powers. Great Britain probably with the theory of counter-bombing in her mind has been experimenting with motor silencers for years. As a matter of fact, the Royal Aircraft Establishment had a fairly efficient silencer as far back as 1918 but the weight of the device was prohibitive.

Today the Vokes-Blanvac and the three distinct types designed by the Royal Aircraft Establishment appear to be the most advanced and we are presenting details of their interiors and general design features in the accompanying illustrations. In most cases it will be noticed that elements to accommodate the high frequency sounds are carefully placed and arranged in the low frequency annular compartments. In some a system of venturi tubes are used to take care of the high frequency sounds.

Automobile engines have been silenced and the same can be done for aviation motors. Back-pressure, the problem faced in any form of such silencer is admittedly one of the stumbling blocks. As is generally known the back pressure created in the automobile-type muffler cuts down the power output about one-third. Such a sacrifice in an aviation engine could not be tolerated, so silencers intended for aircraft must be designed to handle this problem.

The back-pressure comes from the partial stoppage of exhaust gases in their attempt to leave the exhaust ports. As a result a certain amount of exploded gases from the previous power stroke remain in the cylinder. This weakens the incoming fuel-vapor considerably, thus cutting down the power because of the space occupied by the carbon dioxide gas and oil vapor.

The problem then, is to design a muffler that will allow the exhaust gases to leave the engine ports at once. Then it must baffle them in such a way that their efforts to create vibration on the outer air are lessened or stifled entirely. A study of the details of the Blanvac silencer included in the accompanying drawing will show that the designer has used a fairly large muffler body, and in that way has taken the first step toward snubbing the back-pressure. Then, once he has the gases trapped in the main portion he runs them around an inner cone and creates a vacuum which absorbs some of the noise. To go further, he still keeps control of the gases sending them out through small ports until they are completely slowed up before passing out into the air to raise their "unearthly clangor," as the boys on the corner have it.

These, then, are the details of the silenced plane. Whether Germany, or Great Britain has solved the problem, we do not know. How far the United States has progressed along this line, is even a greater mystery. But whoever has a silenced plane is fully ten years ahead of any other air service, regardless of size, service, speed or armament. As the old fighter once said: "You can't hit what you can't see."

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Under the Hood

(*Continued from page* 40)

going aboard Navy aircraft carriers because of the tense "international situation." . . . The quote is from the official explanation for the order. . . . The Navy used to let newspapermen cover maneuvers at sea aboard the carriers but no longer. . . . Looks like the Navy expects a war soon.

* * *

Pan American's bids for the new big ocean transports to carry 25,000 pound payloads 5,000 miles at speeds up to 299 m.p.h. will cause plenty of headaches among the country's top designers. . . . This blind pilot's bet is that the machines which answer the specifications will be modified flying wings and that they will be seaplanes, not landplanes. . . . File that away for reference some six months hence when the contracts are signed. . . . Donald Douglas and Igor Sikorsky have been talking flying wings as big ships for two years.

* * *

It's about time for you to hear something more from Howard Hughes, the temperamental millionaire who can buy himself anything he wants in the way of airplanes. . . . He's been going to a navigation school for months readying himself for his round the world trip in a new Sikorsky S-43. . . . The airplane has so many gas tanks aboard that he probably won't be able to have even a co-pilot.

His ship carries fuel for 3,600 miles non-stop and has all the gadgets, radio, Sperry automatic pilot, etc. . . . He'll be glad to fly alone, he is supposed to have said.

Incidentally his record-breaking land plane is kept in a special air-conditioned hangar at Newark. . . . A heater keeps the temperature in the place at the same level at all times, and two men stand guard. . . . The temperature is kept at 78 degrees so the plywood in the wings —and they are just about solid plywood —won't warp, swell, or rot.

* * *

My advice is for you to discount all the stuff you hear about the big four-engined airplanes not being able to land in most of the airports now used by the airlines. . . . TWA's pilots are told by the army boys flying the B-17 four-engined Boeing bombers—*Flying Fortresses* to you—that they land at about 55 m.p.h. and climb like autogiros. . . . The Douglas DC-4 probably will have similar characteristics.

* * *

Pan American Airways' accident off Pago-Pago and the death of Capt. Ed Musick is a particularly heavy blow because Pan Am is vieing with Imperial Airways for rights to fly from New Zealand to Australia.

* * *

FLASH! Rumors have it that Northwest Airlines' recent crash in Montana will be laid to structural failure . . . it's said that vibration in the tail did the damage . . .

END

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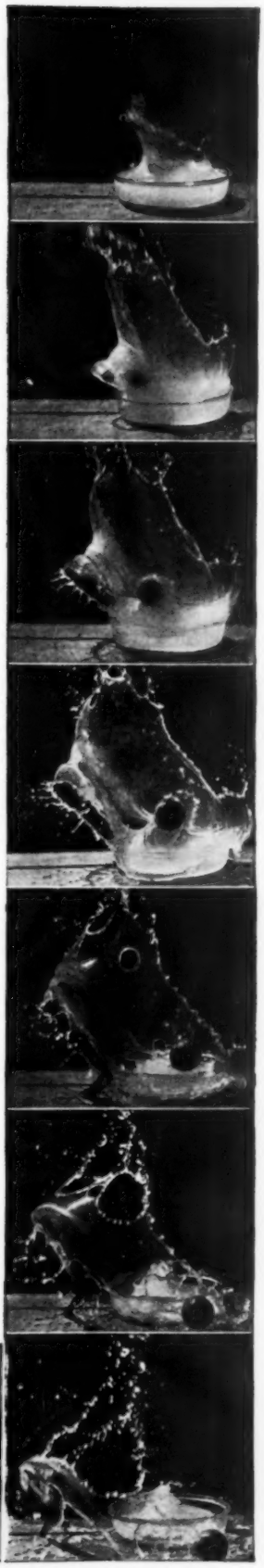

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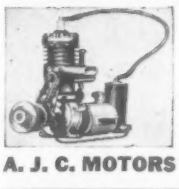

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D. S. C. War Aces

(Continued from page 54)

tion of his machine gun he brought one plane down in flames and drove the other five back into their own lines.

On May 13, 1918, he took the offensive against two German planes at an altitude of 2,500 meters over Lironville, France, shot down one of them.

On June 5, 1918, accompanied by another pilot, he attacked two enemy battle planes at an altitude of 5,700 meters over Epley, France. After a spirited combat he was shot through the back by a machine-gun bullet, but in spite of his injury he kept on fighting until he had forced one of the enemy planes to the ground, where it was destroyed by artillery fire.

* * *

Edward P. Curtiss

Residence and born—Rochester, N. Y. General Order No. 138, W. D., 1918. In the region of Stenay, France, Sept. 29, 1918. First Lieutenant, pilot, 95th Aero Squadron, Air Service.

He volunteered to perform a reconnaissance patrol of particular danger and importance, 30 kilometers within the enemy's territory. He made the entire journey through a heavy anti-aircraft and machine-gun fire, and flew at an extremely low altitude.

* * *

Murray K. Guthrie

Residence and born — Minneapolis, Minn. General Order No. 37, W. D., 1919. Near Andevanne, France, Oct. 1, 1918. First Lieutenant, 13th Aero Squadron, Air Service.

He was a member of an offensive patrol of four planes which was attacked far behind the enemy lines by six German machines. One of our pilots was forced to withdraw by the failure of his machine guns, and two others were surrounded and overpowered. Lieutenant Guthrie fought the six enemy planes alone for 10 minutes and destroyed one of them.

Oak-leaf cluster (2). For the following act of extraordinary heroism in action near Montfaucon, France, Oct. 4, 1918, Lieutenant Guthrie is awarded an oak-leaf cluster to be worn with the distinguished service cross: When the leader of his patrol was blown to pieces by a shell, Lieutenant Guthrie took command and attacked the formation of six enemy planes. Although he became separated from his companions, he succeeded in destroying one of his opponents.

For the following act of extraordinary heroism in action near Fontaines, France, Nov. 4, 1918, Lieutenant Guthrie is awarded another oak-leaf cluster: As flight commander he led his formation of six planes to the attack of seven enemy planes (type Fokker). Six of the enemy were destroyed, one of which was sent down by Lieutenant Guthrie. Immediately following this combat he attacked and drove off four hostile machines (type Fokker) which were about to attack one of our balloons.

END

Flying Sentinels

(Continued from page 46)

motors idling to conserve precious gasoline the plane finally reached a small cove, shattered by a fierce battle with the sea—but its mission complete and two more lives saved by the Coast Guard air service.

Landings in the open sea, as we have pointed out, are not uncommon to Coast Guard airmen. Nor is it unusual for a sick member of a vessel's crew to be taken ashore for hospital treatment on a Coast Guard plane. I can recall an incident of a few years back that occurred along the New England coast. A feverish wireless report came from a small vessel, telling that a nude man had been picked up in the water. Apparently he had leaped from a passenger-carrying boat. Further apparent was the fact that he had been in the water for many hours. He was raging mad when taken from the water. A radio message was dispatched to the Coast Guard at Salem and a plane was sent to the scene.

After considerable difficulty a landing was made at sea and the insane man was transferred to the plane. He rebelled against his aerial rescue and was quite a problem for the boat crew, but no problem to the Coast Guard enlisted men. They quieted him down during the flight to the Boston Airport. He was taken to the Marine Hospital nearby and completely recovered a few weeks later. Prime mystery yet is from what boat this man jumped. He doesn't know—nor does the Coast Guard.

Even though the Coast Guard carries out its prime functions along the open waters—it played no small part in the inland floods caused by the rising of the Ohio and tributary waters last winter. Lieutenant Lyons and other Coast Guard pilots flew their big ships to key points and brought relief to scores and hundreds of suffering families—effecting rescues, delivering food and hospital supplies and conducting surveys that were important to those who were assigned to ground activities. Last year, too, the forces of the Coast Guard air service were recruited in Florida to bring relief to hurricane sufferers.

Readers of POPULAR AVIATION who are residents along the Atlantic or Pacific Coasts, are urged to visit one of the U.S. Coast Guard air stations to see these courageous men in action.

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"I Covered Aviation"

(Continued from page 22)

very rugged looking hills. Without a word of warning, the motor coughed once or twice, finally choked and died. Startled out of our sleep, we three passengers woke to see the windows spattered with dirty brown gobs of oil. The oil pump had let go. Exercising some very superb flying ability our pilot swung around and dropped the ship into the only open space for miles around. Had it not been for the fact that the field was muddy and soft, there might have been no damage. However, the damage was slight (a bent prop and a broken landing gear). The trip was finished right there—the mail and passengers were put on a train for a dull four hour trip to the destination. Result: Editorial campaign demanding better maintenance and a better staff crew of mechanics. The airline protested and so did its advertising agency. Despite this, they employed more mechanics and shortened the hours. There have been no forced landings or accidents due to mechanical failure on this run since. . . .

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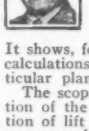

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